DEPARTMENT

FOR

SUPPLYING THE CITY WITH WATER.

ANNUAL REPORT

OF THE

Chief Engineer of the Water Department

OF THE

CITY OF PHILADELPHIA,

Presented to Councils, February 16,

1871.

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1871.

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ENGINEERS AT WORKS.

Fairmount Works—William Osborne, Joseph Moyer.
Schuylkill Works—William Hodges, Joshua Bartley.
Delaware Works—Benjamin F. Norman, Jos. Thompson.
Twenty-fourth Ward Works—Abraham Stott, Christian Betzold.
Germantown Works—William Wright, James Drinkwater.
Roxborough Works—Johnson Hughes, W. H. Saunders.

James M. Kreamer.	In charge of Belmont Reservoir and Engine House, and Delaware Reservoir.
John L. Ogden.	In charge of Schuylkill Works Extensions, Engine, Boilers, &c.
J. Harry Stewart.	In charge of Roxborough Reservoir, and Engine House.
Robert N. Bowers.	In charge of Fairmount Extensions, and General Superintendent.
David R. Griffith.	Superintendent of City Shop.

REPORT.

To the Presidents and Members of the Select and
Common Councils of the City of Philadelphia.

GENTLEMEN:—The following annual report of the condition of the works, and the business of the Department for Supplying the City with Water, is respectfully submitted:

At Fairmount, the completion of the second large turbine wheel and pumps, and the extension of the building to contain it, have been accomplished. The wheel was started to regular work upon the 20th of June, 1870, and has been run almost continually since that time. It is of the same size and arrangement as the first wheel, but in some respects is more perfect, being arranged either to raise the water into the reservoirs at Fairmount or into that at Corinthian avenue, as may be required.

The coffer dam necessary for the excavation of the pit for the third wheel is in place; the quarrying requisite for this is commenced, and progresses satisfactorily, almost all the stone for the foundations and the front of the house is dressed and ready for setting; the cast-iron head gates upon the forebay side are in place, and the wall of the building on that side finished.

The old wooden breast wheels, No. 1 and No. 8, yet remain; they have only sufficient outlay put upon them to keep them in proper running order, as it is proposed to substitute turbines for them as soon as the large wheel, upon which we are now engaged, shall be completed.

The rebuilding of the dam at an early day urges itself upon us. The proper way to do this work has occupied much of my attention, and caused some solicitude, as it presents considerable difficulty on account (more particularly) of the very imperfect manner in which certain cribs were constructed and sunk in the deep water in front of the old dam.

In 1864, my immediate predecessor fortunately detected dangerous weakness in the old superstructure upon which the dam is founded. An appropriation was made for the purpose of its protection, and cribs filled with stone were sunk immediately in front of the breast of the dam.

Upon my first consideration of the rebuilding of the dam, these cribs appeared to present a ready mode of building a new dam upon them, leaving the old one to remain intact, thereby offering perfect protection during and after the construction of the new work.

I much regret to say that further investigation of the subject, and reliable information obtained from competent persons, well acquainted with such work, who saw the cribs put down, develop the unwelcome fact that they are formed of small timber, insecurely put together and imperfectly sunk, and are therefore considered entirely unfit to form a safe and suitable foundation for any new work.

The cribs are sunk below the ordinary low tide, they cannot therefore be seen to any considerable extent, but a personal inspection, as far as is practicable, confirms me in the conclusion that they cannot be used as I had at first intended.

The following words, which occur on page 14 of the Annual Report of the Department for the year 1867, may account in a measure for the imperfect condition of the cribs: "During the progress of this work, which was much delayed by the contractors, who finally abandoned it, making it necessary for the department to finish it, *parts of the cribs were several times destroyed by freshets*, greatly increasing the expense and delaying the completion of the work."

There are two plans left for doing the work—one being the removal of the old dam to low water mark, and then rebuilding it upon the present location. The objections being that it involves the construction of and the reliance upon a temporary coffer dam whilst the work is being done, leaving it exposed to great danger should freshets occur during its progress; likewise would there be difficulty in getting a proper foundation upon the defective parts of the old work, to protect which the cribs above mentioned were sunk.

These cribs are of course in the way of building any new structure immediately in front of the old dam; it would be very difficult and expensive to remove them, as they are filled with stone and sunk in water in some places nineteen or twenty feet deep at low tide; besides, they could not be removed without exposing the old structure to danger.

There appears therefore to be but one other way open, that is, the building of an entirely new dam from the bed rock up, situated below the sunken cribs, at a point about thirty-eight feet lower down stream than the present front of the cribs. This involves the building of new and massive stone piers at the eastern end of the dam, and besides being much more costly, will, to a very considerable extent, impair the beauty of the works, as the front line or overfall of the dam will then be about sixty-eight feet lower down stream than it now is.

The estimate contained in my report to your honorable body, made Nov. 30, 1869, contemplated the use of the cribs, which I at that time supposed might be fit to build upon; of course, that estimate will be inadequate to construct a new dam, as proposed by the last plan.

When the subject of the loan asked for last year (but only partly granted) again occupies your attention, a revised estimate for this work will be presented.

In my judgment, the work should be proseeuted next season; and as much preparation of material, &c., &c., will be required, your early attention to the subject is solicited.

The supply of water for the water power works was ample until the month of August, when assistance had to be obtained

from the Schuylkill Works. This they were able to afford by the use of the new side-lever Cornish engine, and all the old engines, working almost continuously during the whole month.

The dock and inlet to the forebay was dredged out during the summer; a large quantity of mud had accumulated in it, reducing the area of the water-way very considerably.

The reservoirs, grounds and fixtures connected with the works at Fairmount are in excellent condition.

At the Schuylkill Works five new tubular boilers have been erected in the old boiler house, at the east end of the building.

An inlet of large size from the forebay into the building, to supply the double cylinder bucket and plunger engine, now being built, as well as another engine proposed to be hereafter constructed in place of Engine No. 3, has proved unexpectedly to be a difficult and expensive work; much of it was rock excavation, and required the use of a coffer dam and two steam pumps to keep it free of water. It is now finished, except that part immediately in connection with the inlet chambers of the pumps.

It was intended that Engine No. 2 should be taken out early in the summer, but owing to the demand for water this could not be safely done until the middle of November, and this circumstance may probably somewhat delay the erection of the new engine.

The main intended for this engine could not be laid until Master street, between Twenty-ninth and Thirty-third street, was graded. This required the excavation of the street to the depth of 12 to 15 feet through soft rock. The work is now done, and the main will be laid in the spring, in time, it is hoped, for the engine when it is completed.

The working of the side-lever engine has not been entirely satisfactory, owing to mechanical defects in the steam equilibrium and exhaust valves; but the demand for water was so great, that although these defects were early discovered, it was impossible to stop the engine long enough to repair them. They are now being completely overhauled by the contractors, and it is hoped that hereafter better results will be obtained.

The water here was originally carried from the river to the forebay (a distance of about two hundred and fifty feet) through a timber trunk of large size, under the ground and below low water. The bottom of a large part of the wood work failed during the summer, making it necessary to tear it out and make an open cut as rapidly as possible; this was done in the most temporary way, as the exigencies of the work did not admit of any delay.

It is proposed to make a permanent arrangement in the spring. This will be a somewhat difficult and expensive work, as a new position will have to be arranged for it in consequence of using the old defective inlet during the construction of the new.

As the Park Commission is about carrying its river road across the inlet, the new structure will require heavy brick arches, as it will not be proper to renew the work in wood.

The engine, boiler houses, grounds and reservoirs of these works are in good order.

At the Delaware Works the embankments for the new reservoirs have been carried up to their proposed level; they will stand for consolidation during the winter, and be lined and finished next season.

This work was commenced at a fortunate time, as much ground of suitable quality in the immediate neighborhood required grading to bring it into market. A year later, and this material would probably have taken other directions and have been lost to us. The embankments have been raised in the most careful manner, with the same precautions as were used at the Belmont Reservoir; they are exceedingly solid.

Contract was made during the year for a duplex pumping engine for these works, which will be completed early in the season. A thirty-six inch ascending main has been partly laid (over one-half) to the reservoir, and will be finished in time for the new engine.

With the new engine, reservoir and main, these works will be much improved, and will not require the great assistance they have been demanding from Fairmount Works, upon which they have been a serious tax during several years past.

A suction main, 36 inches diameter, was required to be put through the wharf for the supply of the duplex engine, and it was desirable to get this as low as possible below low tide; it was cast together on blocking above the tide, was suspended and then lowered into its position bodily, by the aid of powerful screws. It extends from the engine house to the end of the wharf, a distance of three hundred and thirty-six feet.

The new works on the west side of the river, built as a substitute for the old Twenty-fourth Ward Works, and designated Belmont Works, are now in operation. The engine house is a structure of pressed brick, with Ohio sand-stone window and door dressings; the engine room is calculated to contain three duplex engines, and is 72 feet by 56 feet, inside dimensions; the boiler house back of it is 100 feet by 53 feet. The stack is 100 feet high; the tower on the opposite side of the building is used for an office for the engine drivers, and for work shop and store rooms.

Engine No. 1, "Worthington Duplex," was started to regular work, September 19, 1870, and has, since that time, been in daily operation, supplying the 24th and 27th Wards.

The engine has given entire satisfaction, and is considered by all competent, unprejudiced mechanics as a very superior pumping engine, a well executed, creditable job, working without shock in a remarkably smooth and almost noiseless manner, reflecting great credit upon the inventor and contractor for ingenuity of design and perfection of workmanship.

The water is raised by this engine, through a thirty inch main 4,167 feet long, to a vertical height of two hundred and eight feet above the level of Fairmount Dam.

The boilers supplying the engines are cylinder boilers, 54 inches diameter, with two heaters 26 inches diameter each under them; they are safe and reliable, and can be run almost continuously without much attention, being for those reasons desirable boilers for use in water works, where it is essential that not any unnecessary delay should occur; they are however not as economical as the Cornish or some other forms; the duty of the engine will be somewhat reduced from this fact.

The engine was subjected to a trial for duty of twenty-five consecutive hours, and notwithstanding that the boilers are not as economical as is desirable, a duty nearly twenty per cent in excess of that guaranteed by the contract was readily obtained.

The old works have not been used since September 19, 1870, and will be abandoned as soon as the second engine is started at Belmont.

Photographs of the Engine House, and Engine No. 1, will be found in the front of this report.

The reservoir at George's Hill is only partly completed, the eastern section being finished so as to contain 16 feet in depth of water. The cost of this work has exceeded the estimate, on account, principally, of the unexpected large quantity of rock found in it, and an enlargement of its dimensions beyond what was originally intended. It will be remembered that when the work was commenced, it was bounded on all sides by public streets which limited its size; since then, the Park has been created, and the bounds could therefore be extended over what would have been streets; advantage was taken of this to enlarge the size of the work, even at the risk of exceeding the estimate.

The Reservoir is of the embankment variety, the earth for forming which was excavated from the centre of it; great care was used in making up the embankment, and in protecting the rock bottom from leakage, which latter work was (from the almost vertical and broken stratification of the rock) difficult and expensive.

I am happy to say that thus far the Reservoir has proved to be perfectly tight. The remaining part of this reservoir can be finished next summer, if the necessary appropriation be made early.

The Roxborough works have been a source of great annoyance and expense. As detailed in my last annual report, the Reservoir was so leaky that it was found necessary (after several ineffectual efforts at repair) to take out and reline the entire Reservoir; in doing so, it was found that in many places large heading stones forming the lining had been forced entirely through the clay puddle into the porous embankment; the whole lining, in other respects,

was found to have been put up in an exceedingly careless manner; the foundation under the stone walls of the outlet stop houses was also grossly defective, making the tearing down of the whole stop houses necessary.

Pumping was recommenced December 21, 1870.

As has been before detailed, an auxiliary engine will be required at this Reservoir, to raise water for the proper supply of Germantown. A small engine and boiler house has been erected for the purpose, with a stand pipe formed of the ordinary 30 inch mains; into this the water will be pumped from the Reservoir by means of two Knowles pumps; these were purchased during the drought of 1869, for use at Fairmount, and will now be made useful at Roxborough.

A contract has been made with Mr. Worthington, for a duplex engine for these works, capable of raising 5,000,000 gallons per day into the present Reservoir, and so arranged that it can hereafter be made to raise 8,000,000 into a low level Reservoir, should such be built, without any other alteration than the enlargement of the plungers.

The head of water is now so great upon the lower part of Manayunk, that much difficulty will be experienced in keeping the private pipes and fixtures in proper order; several of the main service pipes have already burst from the pressure.

It will doubtless be proper, as soon as practicable, to erect a Reservoir for the supply of Manayunk, at a level of at least 100 feet below the present one, as that will give an ample head to all parts of the place, and leave the present Reservoir for the supply of Germantown and Roxborough.

The main for the supply of Germantown, as well as the pipe aqueduct crossing the valley of the Wissahickon, were finished during the summer.

This structure consists of two lines of flange pipes 20 inches inside diameter, placed parallel to each other at a distance of 14 feet from centre to centre, forming the compression chord of the aqueduct; each line of pipe is supported by two lines of wrought iron links, 10 square inches in section, attached to lugs cast upon the end pipes of each span; from these, vertical wrought iron

phoenix columns 5⅜ inches diameter support the pipe, entering into bosses upon the under side of the same; the whole is placed upon three piers, formed of four phoenix columns, each 8⅜ inches diameter, stiffened by cross ties and horizontal wrought iron beams. The aqueduct consists of four spans, each one hundred and sixty-five feet nine inches in the clear. The piers are 7 by 14 feet, founded on stone bases.

This plan of supporting pipes was originally designed by me, and put into operation in 1868, upon the pumping mains of 36 inch diameter, crossing the forebay at Fairmount. Finding it entirely successful there, I had not any hesitation in extending the principle to longer spans, particularly as a greater amount of deflection could be obtained for the chains in the Wissahickon aqueduct than was possible at Fairmount.

A contract for the erection of the work was made with John Murphy, C. E., and that he might be held responsible, the design for the details of construction were intrusted to him, subject to my approval. The work has been put up under his contract in a creditable and workmanlike manner, and forms a light, beautiful and stable structure.

An engraving showing its details will be found attached to this report.

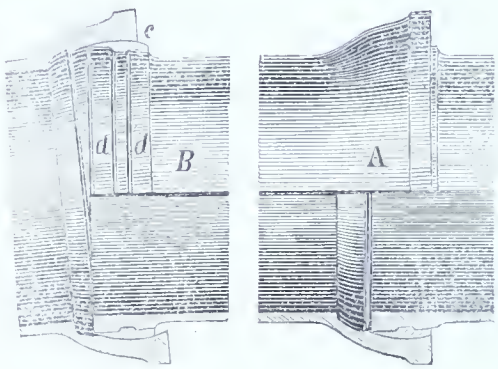
The Germantown works suffered seriously this summer from the low stage of water in the pool supplying it; this fell to a level fourteen feet below its normal condition, and caused great uneasiness for fear it would entirely fail; it was finally relieved by rain. The works will be abandoned as soon as possible, probably in a few weeks.

For reasons detailed in my special report, made to Councils November 30, 1869, it was decided to use the Belmont Reservoir for the supply of the high wards on the east side of the river, particularly the 20th and 28th Wards; to do this, it became necessary to cross the river with the main, and it was first proposed to do so somewhat in the same manner as at the Wissahickon. This plan was, however, abandoned in favor of that of a submerged pipe, designed and patented by Mr. John F. Ward

of Jersey City; a contract was accordingly made with that gentleman and the main has been successfully laid.

It is 36 inches diameter, has a movable joint of simple and peculiar construction which admits its being sunk length after length, from scows, by suitable skids and derricks.

The inside of the bell of the pipe is turned smooth to a spherical form, the small end of the pipe has grooves in it to retain the lead; when two pipes are put together, a lead joint is cast and caulked in the ordinary way. The smoothness and form of the inside of the bell permits the requisite motion, the lead joint slipping upon that, whilst it is retained firmly by the grooves in the small end of the pipe.



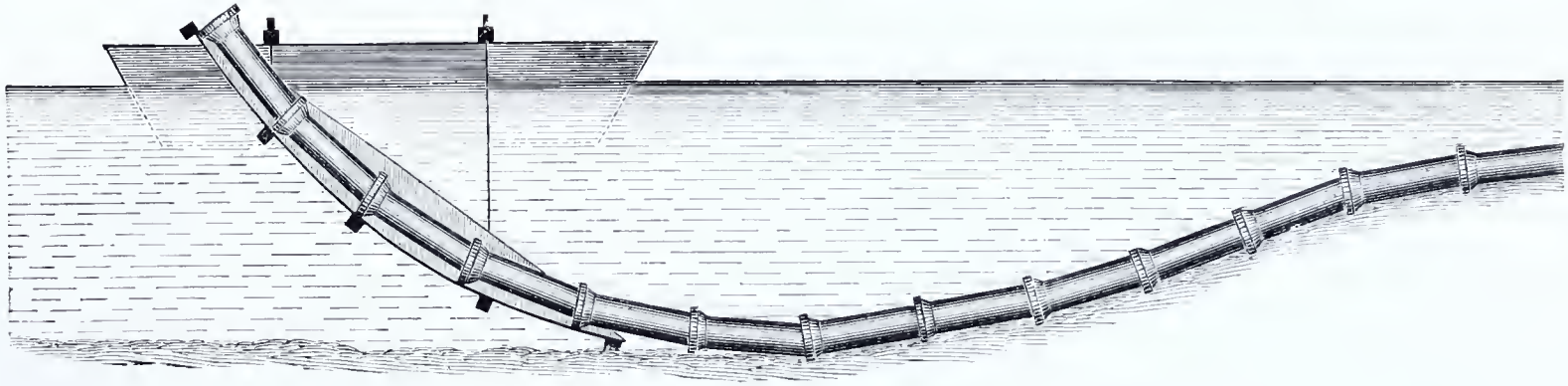
SECTION OF FLEXIBLE JOINTS.

A shows Bell of Pipe.
B " Small End.
C " Lead Joint.

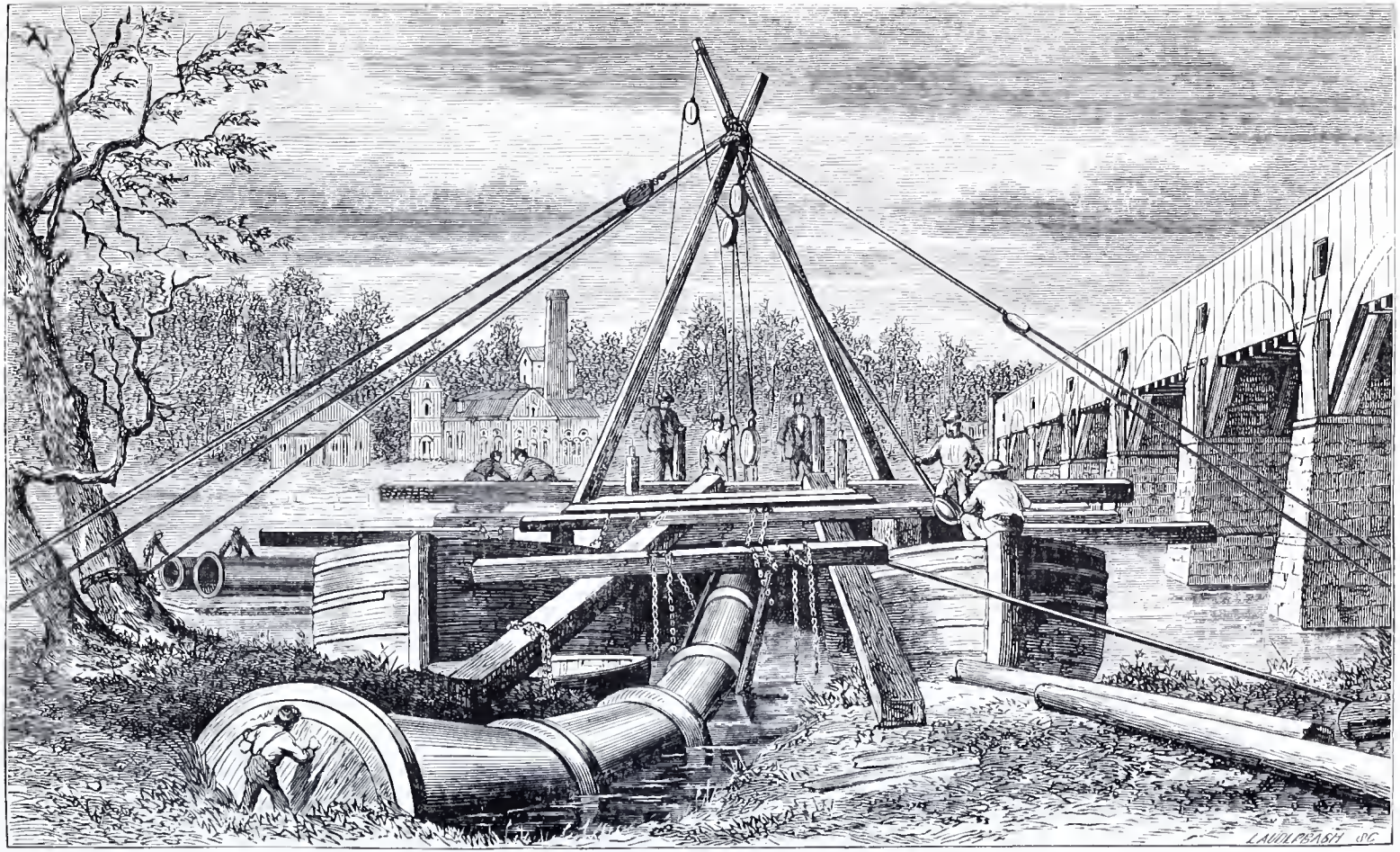
The total length of the pipe is 963 feet, and the deepest water 25 feet; at each side of the river, at the shore ends, a suitable channel was dredged to receive it; a cut of the joint and the skids for laying the pipes is attached hereto.

On the west side of the river a 36-inch main is now laid from the termination of the submerged pipe to the Reservoir; this will be used both as a supply and pumping main, Engines No. 2 and 3 being attached to it.

On the east side of the river, the main will be reduced to 30 inches diameter, and will be laid along Pennsylvania avenue to Thirty-



Showing method of sinking the pipe on the bed of the River.



Commencement of laying the main on the East side of the River.

third street, thence to Master street, thence to Twenty-sixth street, thence to Jefferson street, thence to Ridge avenue; about 3,800 feet of this main has been laid, and the rest will be put down early in the spring. At Twenty-second street, a 20-inch main will be connected and run to north College avenue, where it will be attached to the 16-inch main now in use. Other considerable additions to the distributing pipes of these wards will be necessary before the supply can be entirely satisfactory.

The supply of water distributed during the past year has been much greater than during any previous year. The average daily supply from all the works, for the whole year, has reached 37,149,385 gallons. The average supply for the month of July was 46,008,735 gallons per day—and the maximum supply of any one day was on July 20, 1870, when 54,654,509 gallons were delivered. This was equal to 81 gallons per day for each one of the population of the City per last census; but our citizens do not all get a supply from the works, many in the rural wards obtaining water from springs and wells. The water supplied on that day was equal to $92\frac{3}{10}$ gallons for each of the population who actually receive water from the works, and 540 gallons for each of the water tenants now upon our books; of course, no one can believe that each man, woman and child of the population supplied, consumed for their actual wants $92\frac{3}{10}$ gallons a day; therefore, the immense amount *wasted* must be evident.

The increase in the water supply is in much greater ratio than the increase of population, as will be more fully shown by the table below. This occurs, probably, on account of the multiplication of modern conveniences for using water; such as water closets, wash basins, stationary wash tubs, wash pavements, and the increased number of each now considered necessary or desirable in our dwellings; besides, the more lavish discharge of waste water into drains and sewers than formerly—whereby it can be wasted without fear of detection.

Whilst the supply of water delivered in our city is as copious as that of any other in the United States, the price charged for it is very much lower; a very trifling increase in some of our

charges, for what may be considered as the "luxuries of water supply," and which would scarcely be felt as onerous, would enable us to make a marked increase in our revenue, and a corresponding decrease in direct taxation

Table showing the population of the City and the average daily supply of the year, at intervals of ten years, from 1810 *to* 1870.

YEAR.	Population.	Gallons of water per day—average throughout the year.	Per cent of increase in population.	Per cent of increase in water supply.	Gallons per head per day.
1810	96,664	757,925			8.
1820	119,325	1,537,200	23	103.8	12.8
1830	167,811	3,074,644	40	100.	18.3
1840	225,359	4,922,257	34	60.	21.8
1850	408,763	7,432,237	81	51.	18.1
1860	565,592	27,345,176	38	267.	48.1
1870	673,726	37,149,385	19	35	55.1

An unusual number of new permits have been granted, amounting to 12,430; this fact exhibits the rapid increase of new buildings, and is to some extent a measure of the increase of water supply.

Over 26 miles of distributing pipe have been laid, including mains of 30 and 36-inch diameter, making the aggregate amount of mains and pipes used in distributing the water 488½ miles, a greater amount by nearly one hundred and fifty miles more than any other city in the United States, and only exceeded in the world by the city of London

An analysis of the Schuylkill water made in April, 1870, by Mr. Francis C. Phillips, shows that the quality of the water does not deteriorate; a comparative table given below exhibits the gratifying fact that the quality of the water has not materially changed since the first published analysis made by Professor Boye as far back as the year 1842.

The figures show the grains and decimals of a grain of solid matter contained in our United States standard gallon of 231 cubic inches in

	Profes'r Boye 1842.	F.C. Phillips Ap'l, 1870.
Choride of Sodium	0.153	0.4870
Sulphate of Soda	0.560	0.4798
Sulphate of Potassa		0.4315
Carbonate of Soda	0.185	
Sulphate of Lime		0.2879
Carbonate of Lime	2.190	1.5623
Carbonate of Magnesia	0.484	0.6019
Alumina and Oxide of Iron	0.077	0.0934
Silicic Acid	0.395	0.2979
Total grains inorganic matter	4.044	4.2417
" " organic matter	0.036	0.2570
Total grains of solid matter	4.080	4.4987

The expenditures for new construction and maintenance have been unusually large, reaching the sum of $1,144,053 50. The receipts for water-pipe and water rents have been $928,035 95, as will be seen from the detailed tables attached to the report of the register.

The receipts from all sources have been $935,370 96, being an increase of $121,900 13 over the receipts of the previous year. The expenses for maintenance of all the works were $448,604 83, the receipts have therefore been $486,766 13 more than the expenses of maintaining all the works. The operations of the machine shop are very satisfactory; a new lathe large enough to face the valves of a cock thirty-six inches diameter has been added to our stock of tools, the cost of it has been fully paid by the saving effected in the fitting up of the 30 and 36-inch cocks alone.

It is confidently hoped that a loan will be authorized for the improvement of the works, as detailed in my report of Novem-

ber 30, 1869, and particularly for the construction of the large storage reservoir, proposed to be built upon the East Park, the necessity for which is becoming daily more apparent. Since the report referred to was made, new matter has pressed upon us, and a larger loan than was then proposed will now be required.

At the last meeting of the State Legislature a bill was passed obliging the City to purchase the works of the Chestnut Hill Water Company, at a price to be awarded by a jury. Under this act an award was made, but as it was considered much too large an appeal was taken, and the matter is as yet undecided.

The very great increase in the receipts of the last year, the improved efficiency and enlarged capacity of all the works, are in the highest degree satisfactory.

The statistical tables accompanying this report will be found of interest to your honorable body, and to those connected with similar works in other cities.

The City Corporation commenced supplying Philadelphia with water from the Centre Square Works January 21, 1801. I have therefore the honor to make this the sixty-ninth annual report upon the condition of the works employed to distribute pure water to the citizens.

Very respectfully,

FREDERIC GRAFF,

Chief Engineer Water Department.

Operations of Fairmount Works for the year 1870.

MONTHS.	Running time.	Number of strokes during the month.	Total number of gallons pumped during the month.	Average gallons per day.	Cubic feet of water pumped per month.	Coal consumed in heating mill house.				Tallow consumed.	Oil consumed.	Average depth of water passing over the dam.	Rain-fall during the month.	Average temperature.
	Days.					Tons.	Cwts.	Qrts.	Lbs.	Pounds	Quarts.	Inches.	Inches.	
January	31	2,184,192	467,697,701	15,087,023	62,526,131	.....	.....	.....	.....	22	177	19.56	4.07	41.07
February	28	2,019,482	498,533,700	17,801,775	66,618,890	.....	.....	.....	.....	5	246	17.16	2.53	34.93
March	31	1,970,456	478,765,020	15,444,033	64,006,049	.....	.....	.....	.....	53	167	15.6	4.06	37.87
April	30	2,928,681	697,158,120	23,238,601	93 202,957	.....	.....	.....	.....	.....	260	18.8	5.61	53.50
May	31	3,095,425	735,790,111	23,735,175	98,367,702	.....	.....	.....	.....	10	175	9.3	6.28	65.26
June	30	3,058,471	732,523,891	24,417,463	97,931,001	.....	.....	.....	.....	43	329	10.8	2.86	77.21
July	31	2,872,317	811,940,200	26,191,619	108,548,155	.....	.....	.....	.....	43	275	10.28	3.95	80.61
August	31	2,877,587	843,390,504	27,206,145	112,752,741	.....	.....	.....	.....	29	302	9.85	5.12	78.82
September	30	1,517,098	481,860,437	16,062,011	64,419,841	.....	.....	.....	.....	38	179	4.92	1.71	70.50
October	31	2,601,439	789,184,402	25,457,561	105,505,936	.....	.....	.....	.....	24	225	7.35	3.9	60.12
November	30	2,588,512	782,654,323	26,088,477	104,632,930	.....	.....	.....	.....	38	185	7.11	2.1	46.26
December	31	2,719,881	845,186,458	26,306,015	109,022,227	80	.....	.....	.....	.....	171	9.41	1.89	35.50
Totals	365	30,463,604	8,131,985,170	22,253,242	1,087,564,833	80	.....	.....	.....	285	2,691	.....	44.08	.....

Running Expenses of Fairmount Works.

Salaries of Engineers, and labor, - - -	$5,000 00
Gas and Oil for Lighting Works, - - -	986 55
80 tons Coal for Heating Works, at $7, - -	560 00
673 gallons of Oil, at 81 cts., - - - -	545 13
285 pounds of Tallow, at 18 $\frac{8}{10}$, - - - -	53 58
Packing and Small Stores, - - - - -	1,050 00
Repairs, - - - - - - - - -	7,561 80
	$15,757 06
Cost of raising water into reservoir per million gallons, - - - - - - - - -	$1 93$\frac{8}{10}$
Cost of raising water per million gallons one foot high, - - - - - - - - -	01$\frac{9}{10}$

Operations of the Schuylkill Water Works during the year 1870.

MONTHS.	Running time. Days.	Number of strokes during the month.	Total number of gallons pumped during the month.	Average gallons per day.	Cubic feet of water pumped per month.	Number of pounds of water raised one foot high per pound of coal.	Coal consumed. Tons.	Cwts.	Qrs.	Lbs.	Tallow consumed. Lbs.	Oil consumed. Qts.
January	31	416,317	201,105,120	6,487,230	26,885,711	370,707	232	.....	.....	.....	146	62
February	28	414,035	177,926,100	6,354,504	23,786,912	278,562	273	.....	.....	.....	199	79
March	25	445,308	196,944,180	7,877,767	26,329,436	335,943	250	13	2	24	215	68
April	26	415,589	186,930,390	7,189,630	24,987,152	261,674	303	17	.....	.....	187	113
May	29	961,977	261,586,818	9,020,235	34,971,499	365,664	305	17	.....	.....	155	87
June	30	821,275	265,639,770	8,854,659	35,512,001	329,573	341	14	.....	.....	270	168
July	31	807,403	323,468,370	10,434,431	43,244,434	360,247	384	.....	.....	.....	290	124
August	31	635,450	250,298,700	8,074,151	33,462,393	295,738	361	19	.....	.....	184	189
September	30	1,777,901	505,027,954	16,834,265	67,517,106	234,564	645	10	.....	13	386	159
October	31	815,779	279,406,310	9,013,107	37,353,785	303,469	393	15	.....	.....	275	128
November	29	653,703	240,136,454	8,280,567	32,103,804	341,069	301	2	.....	.....	262	63
December	31	289,700	105,267,000	3,395,709	14,073,128	386,255	116	11	.....	.....	100	27
Totals	352	8,454,437	3,003,737,166	8,484,688	400,227,361	.....	3,912	18	2	37	2,669	1,267

Running Expenses of Schuylkill Works.

Salaries of Engineers, Firemen, &c.,			$8,300 00
Gas and Oil for Lighting Works,			1,243 26
3,912 $\frac{18}{20}$ tons of Coal, at average price,	$5 48½,		21,457 32
316$\frac{3}{4}$ gallons of Oil, " "	75½,		239 15
2,669 pounds of Tallow, " "	18 $\frac{7}{10}$,		499 11
Packing and Small Stores,			703 00
Repairs,			4,183 99
			$36,625 83

Cost of raising water into reservoir per million gallons,	$12 19$\frac{3}{10}$
Cost of raising water per million gallons one foot high,	10$\frac{6}{10}$

Operations of the Delaware Water Works during the year 1870.

MONTHS.	Running time.	Number of strokes during the month.	Total number of gallons pumped during the month.	Average gallons per day.	Cubic feet of water pumped per month.	Number of pounds of water raised one foot high per pound of coal.	Coal Consumed.				Tallow consumed.	Oil consumed.
	Days.						Tons.	Cwts.	Qrs.	Lbs.	Lbs.	Qts.
January	30	478,636	81,846,756	2,701,892	10,942,080	201,080	169	16	.....	95	32	21
February	26	458,851	75,069,152	2,887,275	10,035,983	219,218	142	13	.....	50	34	15
March	26	451,408	76,868,417	2,956,493	10,276,520	235,393	135	21	.....	45	26	16
April	27	521,580	83,452,800	3,091,215	11,156,791	241,226	137	10	.....	20	22	19
May	31	622,642	99,622,720	3,213,636	13,318,545	260,259	163	.....	.....	.....	26	19
June	30	628,048	101,032,158	3,367,738	13,506,973	258,495	162	15	.....	75	32	26
July	25½	806,820	132,866,204	5,210,439	17,762,861	207,220	267	1	.....	40	34	24
August	31	742,707	102,469,669	3,305,473	13,699,154	193,626	224	.....	.....	75	52	35
September	30	861,810	142,641,010	4,754,700	19,069,653	186,863	318	16	.....	28	56	35
October	31	752,258	122,679,178	3,957,393	16,400,959	197,106	259	2	.....	97	56	28
November	30	551,640	88,742,400	2,958,080	11,863,957	188,113	196	9	.....	72	36	18
December	27	492,723	78,835,680	2,919,840	10,539,529	231,225	121	.....	.....	.....	26	16
Totals	344½	7,378,123	1,186,131,141	3,143,932	158,573,011	....	2,298	8	1	9	432	272

Running Expenses of Delaware Works.

Salaries of Engineers, Firemen, &c., - - -	$6,533 60
Gas and Oil for Lighting Works, - - - -	486 55
2,298 $\frac{8}{20}$ tons Coal at average price, $5 36 $\frac{3}{10}$, -	12,326 31
68 gallons of Oil, " " 80 $\frac{7}{10}$, -	54 87
432 pounds of Tallow, " 18 $\frac{5}{10}$, -	79 92
Packing and Small Stores, - - - - -	550 00
Repairs, - - - - - - - - -	3,387 90
	$23,419 15

Cost of raising water into reservoir per million gallons, - - - - - - - - - -	$19 74 $\frac{4}{10}$
Cost of raising water per million gallons one foot high, - - - - - - - - - -	17 $\frac{6}{10}$

Operations of the Twenty-fourth Ward Water Works during the year 1870.

MONTHS.	Running time.	Number of strokes during the month.	Total number of gallons pumped during the month.	Average gallons per day.	Cubic feet of water pumped per month.	Number of pounds of water raised one foot high per pound of coal.	Coal consumed.				Tallow consumed.	Oil consumed.
	Days.						Tons.	Cwts.	Qrs.	Lbs.	Lbs.	Qrts.
January	31	659,960	57,225,840	1,845,995	7,650,513	272,596	144	8	1	16	50	8
February	28	566,233	51,638,570	1,844,235	6,903,552	278,235	127	13	2	8	45	8
March	31	591,567	53,241,030	1,717,453	7,104,416	299,334	122	7	1	8	45	8
April	30	761,608	71,331,336	2,377,711	9,536,274	323,944	151	8	2	8	50	10
May	31	923,133	87,778,746	2,831,572	11,735,127	358,525	168	8	3	.....	50	10
June	30	1,032,118	99,236,656	3,307,888	13,266,932	369,035	184	19	.....	12	50	10
July	31	1,104,461	106,145,836	3,424,059	14,190,619	330,463	220	19	2	6	60	11
August	31	1,133,838	108,864,736	3,511,766	14,554,109	343,438	218	1	2	12	60	10
September	19	561,666	53,912,782	2,837,515	7,207,591	334,130	111	10	1	27	40	8
October*	30	173,752	53,863,120	1,795,437	7,200,952	431,063	96	6	3	4	30	10
November*	29	174,475	54,087,250	1,865,078	7,230,916	436,279	96	13	.....	4	50	8
December*	30	169,959	52,687,290	1,756,243	7,043,755	410,462	100	.....	.....	.....	50	9
Totals	351	7,852,940	850,011,192	2,426,246	113,624,756	.....	1,742	17	.....	21	580	110

*New Works at Belmont.

Running Expenses of Twenty-fourth Ward Works (Old).

Salaries of Engineers and Firemen,	-	-	$3,299 84
Coal Oil for Lighting Works,	-	-	63 56
1,449 $\frac{17}{20}$ tons of Coal at average price,	$6 10,	-	8,844 00
20$\frac{3}{4}$ gallons Oil, " "	80,	-	16 60
450 pounds Tallow, " "	19,	-	85 50
Packing and Small Stores,	-	-	262 50
Repairs,	-	-	2,499 82
			$15,071 82

Cost of raising water into stand-pipe per million gallons, - - - - - - - - -	$21 86$\frac{3}{10}$
Cost of raising water per million gallons one foot high, - - - - - - - - - -	11$\frac{8}{10}$

Belmont Works (New).

(Worthington Duplex Engine.)

Salaries of Engineers and Firemen, - - -	$1,099 95
Coal Oil for Lighting Works, - - - -	21 18
293 tons Coal, at average price, $6 10, - -	1,787 30
6¾ gallons Oil, " " 80, - -	5 40
130 pounds Tallow, " 19, - -	24 70
Packing and Small Stores, - - - - -	87 50
	$3,026 03

Cost of raising water into reservoir per million gallons, - - - - - - - - - -	$18 83 7/10
Cost of raising water per million gallons one foot high, - - - - - - - - -	09 05/100
Cost of running Belmont Works (new), as per statement above, - - - - - - - -	$3,026 03
Less 52 9/20 tons coal, banking fires, at $6 10, -	319 95
	$2,706 08
Cost of raising water into reservoir per million gallons (less banking fires), - - - - -	$16 84 5/10
Cost of raising water per million gallons one foot high (less banking fires), - - - - -	08 1/10

The old Twenty-fourth Ward Works, having no reservoir, were kept running continuously to keep the stand-pipe full; therefore, there was no loss in banking fires.

Thus far the new Belmont Works have only run an average of nine (9) hours per day, the fires are then banked for the balance of the day. The amount of coal consumed in banking fires is therefore deducted from the last statement, but is included in the first.

Operations of the Germantown Water Works during the year 1870.

MONTHS.	Running time. Days.	Number of strokes during the month.	Total number of gallons pumped during the month.	Average gallons per day.	Cubic feet of water pumped per month.	Number of pounds of water raised one foot high per pound of coal.	Coal consumed. Tons.	Cwts.	Qrs.	Lbs	Tallow consumed. Lbs.	Oil consumed. Qrts.
January	31	1,681,000	15,625,600	504,052	2,088,984	215,558	62	.....	.....	.....	21	9
February	28	1,507,000	13,641,200	487,186	1,823,689	179,635	65	.....	.....	.....	23	10
March	23	1,726,000	15,657,600	680,765	2,093,262	191,322	70	.....	.....	.....	26	10
April	28	1,736,000	15,615,600	557,700	2,087,647	189,578	70	.....	.....	.....	23	10
May	31	2,212,000	19,987,200	644,750	2,672,086	213,699	80	.....	.....	.....	30	12
June	30	2,883,000	21,659,800	721,993	2,895,695	231,575	80	.....	.....	.....	31	15
July	31	2,553,000	23,193,800	748,187	3,100,775	241,384	82	.....	.....	.....	35	15
August	31	2,612,000	23,735,200	765,652	3,039,465	247,572	82	.....	.....	.....	38	16
September	30	2,059,000	18,504,400	616,813	2,473,850	239,794	66	.....	.....	.....	40	15
October	31	2,139,000	19,283,400	622,045	2,577,995	229,065	72	.....	.....	.....	39	14
November	30	2,276,000	20,663,600	688,787	2,762,513	229,525	77	.....	.....	.....	32	14
December	31	2,242,000	20,379,200	657,394	2,724,492	210,002	83	.....	.....	.....	35	14
Totals	355	25,626,000	227,946,600	641,277	30,340,453	.....	889	.....	.....	.....	373	154

Running Expenses Germantown Works.

Salaries of Engineers, Firemen, &c.,	$4,050 00
Coal Oil for Lighting Works,	10 35
889 tons Coal at average price $6.55,	5,822 95
373 pounds of Tallow,	68 26
38½ gallons of Oil,	52 94
Packing and Small Stores,	52 27
Repairs,	1,114 64
	$11,171 41
Cost of raising water into reservoir per million gallons,	$49 00
Cost of raising water per million gallons one foot high,	$21\frac{3}{10}$

Running Expenses of Roxborough Water Works.

Salaries of Engineers and Firemen,	$3,400 00
Oil for Lighting Works,	35 27
895 tons of Coal,	5,368 25
46 gallons Oil,	62 60
556 pounds of Tallow,	103 88
Packing and Small Stores,	175 12
Repairs,	947 58
	$10,092 70

Amount of Water Pumped by all the Works during the year 1870.

MONTHS.	Gallons of water pumped During the month.	Average number of Gallons Pumped per day.
January, . .	823,501,020	26,629,192
February, . .	816,808,722	29,377,975
March, . .	821,476,247	28,676,516
April, . .	1,054,488,246	36,454,860
May, . . .	1,204,765,895	37,445,368
June, . .	1,220,092,275	40,669,741
July, . . .	1,397,614,410	46,008,735
August, . .	1,328,758,809	43,663,187
September, .	1,201,946,583	41,105,307
October, . .	1,264,416,410	40,845,543
November, .	1,186,284,027	39,880,989
December, . .	1,072,655,628	35,035,201
Totals, . .	13,392,808,272	37,249,385

Maximum Supply July 20th, 1870.

Fairmount Works, - - - -	29,921,539
Schuylkill " - - - -	14,856,940
Delaware " - - - -	5,135,750
24th Ward, " - - - .	3,958,680
Germantown, " - - - -	781,600
Total gallons, - - - -	54,654,509

Amount of Water pumped by all the Works during the years 1867, 1868, 1869 and 1870.

MONTHS.	1867.		1868.		1869.		1870.	
	Gallons of water pumped during the month.	Average number of gallons pumped per day.	Gallons of water pumped during the month.	Average number of gallons pumped per day.	Gallons of water pumped during the month.	Average number of gallons pumped per day.	Gallons of water pumped during the month.	Average number of gallons pumped per day.
January	618,287,074	20,005,379	730,464,667	24,851,786	877,284,223	28,507,994	823,501,020	26,629,192
February	711,152,228	28,187,718	825,584,566	30,914,237	857,235,551	30,850,761	816,803,722	29,277,975
March	716,694,210	24,058,725	849,225,424	28,142,180	804,817,745	26,219,793	821,476,247	28,676,516
April	875,050,766	29,259,539	850,197,073	29,632,897	1,044,170,483	35,074,275	1 051,488,246	36,154,860
May	886,321,354	29,384,172	968,861,910	31,719,122	1,120,558,740	36,530,528	1,204,765,895	37,445,368
June	1,023,294,108	34,706,857	1,124,258,325	37,916,924	1,197,573,103	39,935,103	1,220,092,275	40,669,741
July	1,115,559,299	37,639,532	1,225,455,237	39,573,452	1,294,468,963	41,757,063	1,397,614,410	46,008,735
August	1,065,853,766	36,446,543	1,257,133,188	40,555,908	1,139,394,772	36,754,670	1,328,758,809	43,663,187
September	1,043,957,549	39,041,156	1,113,085,190	37,186,021	1,111,435,089	37,047,836	1,201,946,583	41,105,307
October	1,071,726,037	35,396,907	1,169,605,506	37,907,082	1,098,648,339	35,440,337	1,264,416,410	40,845,543
November	880,945,353	30,976,368	973,190,979	32,833,488	970,776,989	32,359,234	1,186,284,027	39,880,989
December	854,579,754	28,615,319	888,116,818	29,310.439	898,388,339	29,151,189	1,072,655,628	35,035,201
Totals	10,863,421,498	29,771,018	11,985,178,883	33,378,628	12,414.752,336	34,040,409	13,382,808,272	37,249,385

Statement of the Operations of the Shop from January 1st to December 31st, 1870.

DR.

To Stock on hand January 1st, 1870,		$4,352 21
337,228 lbs. iron castings,		10,825 06
33,756 " wrought iron,		1,473 00
2,140 " cast steel,		437 54
14,666 " brass castings,		4,003 23
17,600 " lead,		1,496 00
8,883 " bolts, nuts aud washers,		1,369 59
594 " leather,		266 43
422 " gasket,		73 85
18 " listing,		3 60
20 " tallow,		3 60
38,686 feet of lumber,		1,482 73
99 tons of coal,		692 75
Galvanizing spindles for stops,		192 21
Machine work,		134 71
Hardware,		2,240 23
Wrought iron tubing, &c.,		419 65
Paints, oils, &c,		283 96
Scrap iron from districts,		256 10
Wages paid hands, and incidentals,		16,040 17
		46,046 62

CR.

By	7 stop-cocks 3-inch, at $44 00,		$308 00	
	93 " 4-inch, at 48 00,		4,464 00	
	113 " 6-inch, at 62 00,		7,006 00	
	95 " 6-inch, at 42 00,		3,990 00	
	4 " 8-inch, at 89 00,		356 00	
	4 " 10-inch, at 90 00,		360 00	
	Amounts carried forward,		$16,484 00	$46,046 62

Photo. by E. Newell.

ENGINE HOUSE OF THE BELMONT WORKS.

DESIGNED BY FREDERIC GRAFF, CHIEF ENGINEER WATER DEPARTMENT.

Amounts brought forward,	$16,484 00	$46,046 62
10 stop-cocks 12-inch, at 120 00,	1,200 00	
5 " 20-inch, at 220 00,	1,100 00	
6 " 30-inch, at 520 00,	3,120 00	
6 " 36-inch, at 750 00,	4,500 00	
600 stop-cock boxes, at 3 50,	2,100 00	
317 frames and covers, at 7 00,	2,219 00	
223 fire-plugs, at 36 00,	8,028 00	
307 " cases, at 18 00,	5,526 00	
4,200 ferrules, ½-inch, at 50,	2,100 00	
450 " ⅝-inch, at 50,	225 00	
100 " ¾ inch, at 50,	50 00	
100 " 1-inch, at 50,	50 00	
Repairs for First District,	1,258 29	
" Second "	2,389 60	
" Third "	1,776 83	
" Fourth "	1,160 37	
" 30 inch main,	347 28	
" Germantown,	667 11	
" 20 inch main,	533 10	
" Engine House, Germant'n,	76 85	
" West Phila. Engine House,	498 90	
" " Reservoir,	1,178 45	
" Belmont Engine House,	1,797 41	
" Schuylkill Works,	1,679 18	
" " extension,	464 00	
" Delaware Works,	85 43	
" Fairmount "	1,310 92	
" " " extens'n,	1,910 98	
" Roxboro' Engine House,	190 95	
" " new " " and foundations,	50 96	
" Roxborough new Engine House at Reservoir,	130 01	
Amounts carried forward,	$64,208 62	$46,046 62

Amounts brought forward,				$64,208 62	$46,046 62
Repairs for Manayunk District,				153 28	
"	Buildings and grounds,			890 51	
"	Shop fixtures, &c.,			945 88	
"	New engine Schuylkill Works,			724 88	
"	Belmont 36-inch main,			544 10	
"	Delaware 36-inch main,			1,094 74	
"	Reservoir Del. extension,			1,856 40	
"	New boilers Schuylkill Works,			155 20	
New patterns made and repaired,				627 56	
31	sharp thread screws	at	$2 50,	77 50	
5	square "	3-inch, at	$5 00,	25 00	
12	" "	4 inch, at	5 00,	60 00	
28	" "	6-inch, at	5 00,	140 00	
7	" "	8-inch, at	6 00,	42 00	
3	" "	10 inch, at	8 00,	24 00	
4	" "	16-inch, at	12 00,	48 00	
5	old style screws	20-inch, at	14 00,	70 00	
1	new "	30-inch, at	20 00,	20 00	
12	spindles	3-inch, at	5 00,	60 00	
33	"	5-inch, at	5 00,	165 00	
90	"	6-inch, at	5 00,	450 00	
9	"	8-inch, at	6 00,	54 00	
10	"	10-inch, at	8 00,	80 00	
11	"	12-inch, at	10 00,	110 00	
1,148	lbs. bolts and washers,	at	15,	172 00	
344	" wrought iron forgings,	at	13,	44 72	
15,100	" " "	at	4½,	679 50	
800	" cast steel,	at	22,	176 00	
13,802	" iron castings,	at	4,	452 08	
570	" finished brasses,	at	30,	171 00	
1,160	" unfinished brass castings	at	25,	290 00	
Amounts carried forward,				$74,611 97	$46,046 62

Amounts brought forward,			$74,611 97	$46,046 62
3,752 feet assorted lumber,			187 57	
94 wooden plugs assorted	at	50,	47 00	
4 kegs nails,	at	5 00,	20 00	
13 quires emery and flint paper, assorted,			4 80	
102 handles, assorted,			19 00	
172¾ lbs. leather,	at	45,	77 74	
20 plug monkeys, finished,	at	8 00,	160 00	
Hardware, shovels, &c.,			180 00	
Paints, oils, &c.,			114 00	
2 tons coal,	at	7 00,	14 00	
To Balance, nominal profit of shop,				29,389 46
			$75,436 08	$75,436 08

DISTRIBUTION.

Service mains have been laid in the following streets in 1870.

First District.

Account of Iron Pipes laid in the First, Second, Third, Fourth, and Twenty-sixth Wards.

Street.	Location.	Size. Inches.	Feet.
Pierce,	From Passyunk road to Thirteenth,	4	327
Wharton,	" Seventeenth to Mount Holly,	6	228
Morris,	" Front to Otsego,	6	295
Dutton,	" Morris to Mifflin,	4	906
Washington ave.,	" Twenty-third to Twenty-fourth (south side),	6	516
Delaware ave.,	" South to Davis' Landing,	6	1,280
Dudley,	" Ninth (west),	4	365
Pierce,	" Ninth to Tenth,	4	450
Catharine,	" Twenty-third to Twenty-fourth,	6	470

Street.	Location.	Size. Inches.	Feet.
Fitzwater,	From Twenty-third to Gray's F'y R'd,	6	476
Twenty-third,	" Pemberton to Catharine,	6	558
Twenty-fourth,	" Gray's Ferry road to Catharine,	6	335
Moore,	" Ninth to Tenth,	6	450
A certain twelve-feet street, north of St. Albans' place between Twenty-third and Twenty-fourth,		4	472
A certain twelve-feet street, south of St. Albans' place, between Twenty-third and Twenty-fourth,		4	472
McClellan, from Ninth to Tenth,		4	450
Washington avenue (south side), from Third to Jefferson avenue,		4	300
Ellsworth,	From Seventeenth to Eighteenth,	6	356
Afton,	" " " "	4	450
Eighteenth,	" Federal to Washington avenue,	6	675
Davis' Landing,	" Delaware avenue to Swanson,	6	151
Twenty-third,	" Christian to Washington ave.,	6	784
Manton,	" Seventeenth to Eighteenth,	4	450
Grays Ferry r'd	" Terminus of pipe to Patton,	6	186
Patton,	" Grays Ferry road (south),	4	266
Mount Holly,	" Wharton to Reed,	4	450
League,	" Nineteenth (west),	4	245
Sixteenth,	" Reed to Buck road,	6	545
Dickerson,	" Sixteenth to Bancroft,	6	161
Bancroft,	" Reed to Dickerson,	4	460
Pierce,	" Seventh (west),	4	330
Anthony,	" Terminus of pipe to Tasker,	4	265
Twenty-fourth,	" Washington avenue to Alter,	6	224
Manton,	" Eighteenth to Nineteenth,	4	450
McClellan,	" Ninth to Tenth (relaid),	4	450
Bainbridge,	" Penn to Swanson,	4	175
Swanson,	" South to Almond (relaid),	6	588
Reed	" Sixteenth to Bancroft,	6	161
Alter,	" Twenty-third to Twenty-fourth,	4	450
Mountain	" Terminus to Eleventh,	4	117
Ellsworth,	" Twenty-third to Twenty-fourth,	6	450

Street.	Location.	Size. Inches.	Feet.
Carpenter,	From Twentieth (west),	6	420
Fifth,	" Snyder to Moyamensing ave.,	6	466
Twenty-third,	" Catharine to Christian,	6	360
Starr,	" McKean to Snyder avenue,	4	450
Reed,	" Bancroft to Mount Holly,	6	504
Snyder avenue,	" Ninth (east) north side,	6	255
"	" " " south side,	6	253
Pharo,	" Fitzwater to Catharine,	4	400
			20,297
Plug connections,		4	316
" "		6	75
Total number of feet of pipe laid,			20,688
Number of feet of new pipe laid, 4-inch,			9,466
" " " " 6-inch,			11,222
Total number of feet,			20,688

Or 3 miles 4,848 feet.

Second District.

Account of Iron Pipes laid in the Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Twenty-fourth and Twenty-seventh Wards.

Street.	Location.	Size. Inches.	Feet.
Thirty-fourth,	From Race to Lancaster avenue,	6	611
"	Connections,	6	71
Thirty-seventh,	From Centre to Lancaster avenue,	6	620
Story,	" Thirty-eighth to Thirty-ninth,	6	568
Thirty-eighth,	" Haverford road to Lancaster avenue,	6	440

Street.	Location.	Size. Inches.	Feet.
Thirty-eighth,	From Lancaster avenue to Elm,	6	1,574
Woodland,	" Chestnut to Forty-first,	8	1,596
Mary,	" Eadline to Forty-second,	6	1,044
Seneca,	" Lancaster ave. to Forty-fourth,	6	315
"	" Mica to Forty-eighth,	6	1,338
Forty-fourth,	" Haverford to Seneca,	6	1,961
Manning	" Twenty-fourth (east),	4	90
Budd,	" Haverford to Allen,	4	333
Eighteenth,	" Race to Vine,	12	680
Clayton,	" Race to Cherry,	4	332
Thirty-seventh,	" Elm to Grape,	6	212
Grape,	" Thirty-seventh (west),	4	208
Centre,	" Thirty-eighth to Thirty-ninth,	6	345
Ludlow,	" Thirty-seventh to Thirty-eighth,	4	524
Thirty-ninth,	" Centre to rear line church on Powelton avenue,	6	170
Story,	" Thirty-sixth to Thirty-seventh,	6	408
Elm,	" Thirty-fourth to Thirty-sixth,	6	820
Haverford road,	" Forty-third (west),	6	364
Huron,	" Brooklyn (west),	6	775
Aspen,	" Chestnut to Barker,	4	380
Thirty-third,	" Bridge to Haverford,	6	408
Story,	" Thirty-ninth to Union,	6	380
Thirty-sixth,	" Powelton avenue to Filbert,	6	1,098
Belmont ave.,	" Lancaster pike (north),	20	1,214
" "	Connections with main,	12	379
" "	" " "	6	66
Thirty-fourth,	From Elm (south),	6	36
Allen,	" Mary to Budd,	6	140
Race,	" Thirty-sixth to Thirty-fourth,	6	775
Baltimore ave.,	" Forty-first to Forty-second,	8	394
Thirty-seventh,	" Grape (north),	6	406
Rockdale,	" Thirty-sixth to Thirty-ninth,	6	1,470
Connecting with Haverford road,		4	44

Street.	Location.	Size. Inches.	Feet.
Connecting with 20-inch main, Lancaster avenue,		6	144
"	Somerset with Mary,	6	48
Belmont Engine House,		30	190
			22,971
Plug connections,		4	511
Total number of feet of pipe laid,			23,482
Number of feet of new pipe laid,	30-inch,		190
" " " "	20-inch,		1,214
" " " "	12-inch,		1,059
" " " "	8-inch,		1,990
" " " "	6-inch,		16,607
" " " "	4-inch,		2,422
Total number of feet,			23,482

Or 4 miles 2,362 feet.

Lowered pipe on Thirty-seventh, from Elm to Pennsylvania R. R., 1,130

Lowered pipe on Thirty-seventh, from Filbert street (north), 150

Third District.

Account of Iron Pipes laid in the Eleventh, Twelfth, Sixteenth, Seventeenth, Eighteenth, Nineteenth, Twenty-third and Twenty-fifth Wards.

Street.	Location.	Size. Inches.	Feet.
Philip,	From Diamond (north),	4	450
Laurel,	" Delaware avenue to Beach,	6	252
Bodine,	" Norris to Diamond,	4	567
Norris square,	" Diamond to the Fountain,	4	270

Street.		Location.	Size. Inches.	Feet.
Hope,	From	Norris to Susquehanna ave.,	4	1,233
Third,	"	Berks to Norris,	6	564
York,	"	Fifth to east side America,	6	1,260
Lehigh ave.,	"	Fifth to Second, north side,	6	1,572
"	"	" south side,	6	1,512
Kensington ave.,	"	York to Indiana ave., west side,	6	4,848
"	"	" " east side,	6	4,752
Eyre,	"	Girard ave. to Wildey,	4	459
Adams,	"	Emerald to Kensington ave.,	6	888
Philip,	"	450 north of Diamond to York,	4	1,413
Bodine,	"	Diamond to Susquehanna,	4	594
Orianna,	"	Norris to Berks,	4	558
Philip,	"	Montgomery (south),	4	360
Almond,	"	208 south of York to Norris,	6	468
Anthracite,	"	Salmond to Almond,	4	1,008
Dickinson,	"	Cedar to Gaul,	6	432
Almenda,	"	Huntingdon to Lehigh,	6	828
Edgemont,	"	William to Allegheny ave.,	6	2,412
Clearfield,	"	Amber to Frankford road,	6	456
Sepviva,	"	Huntingdon to Jackson,	6	672
Leithgow,	"	Hackley to Norris,	4	297
Montgomery ave.,	"	Germantown ave. to Sixth,	6	504
Randolph,	"	Montgomery to Oxford,	6	996
Somerset,	"	Kensington ave. to C,	6	576
Franklin,	"	Unity to Sellers,	6	600
Green,	"	Paul to Main,	6	516
Lehigh ave.,	"	Blaney to Kensington ave.,	6	87
C,	"	Somerset to Cambria,	6	564
Keyser,	"	Hanover (north),	4	243
Firth,	"	Amber to Coral,	4	432
Melcher,	"	Susquehanna to Coulston,	4	450
Mannakin,	"	" Diamond,	4	639
Fox,	"	189 north of Cumberland to Huntingdon,	4	396
Mutter,	"	Norris to Berks,	6	528

Street.	Location.	Size. Inches.	Feet.
Mutter,	From Dauphin to Davis,	6	456
"	" Dauphin to Cumberland,	6	1,152
Huntingdon,	" Front to Kensington ave.,	6	1,104
Somerset,	" C to Ormes,	6	420
Rosehill,	" Somerset to Cambria,	6	528
Orkney,	" York (south),	4	261
Montgomery ave.,	" Bodine to Cadwalader,	6	540
Memphis,	" Vienna to Montgomery,	6	364
Bath,	" William to Sorrell,	4	279
Buckius,	" Frankford road to Kensington avenue,	6	1,056
Buckius street connection,		10	9
Boudinot,	From Kensington ave. to Somerset,	6	276
Mulberry,	" Orthodox to Oxford,	6	744
Leithgow,	" Susquehanna to Dauphin,	4	630
Lawrence,	" Dauphin to York,	6	618
Adams,	" Frankford road and Kensington avenue.	6	420
Connection at Beach and Laurel (relaid),		10	63
"	Delaware ave. and Laurel,	6	84
"	Isaac Sted's Mill, N. W. cor. Coral and Taylor,	4	18
"	Frankford Arsenal, N. E. cor. Tacony and Bridge sts., 23d Ward,	6	60
"	Bromley & Bros.' Mills, N. E. cor. Emerald and York streets,	6	3
		4	27
"	H. Disston's saw works, Haydock, east of Front,	4	54
Intersections,		4	261
"		6	156
Plug connections,		4	694
"		6	162
Pumping main on Otis street to connect with Delaware Reservoir,		36	6,570

Street.	Location.	Size. Inches.	Feet.
Drain at Delaware Reservoir,		10	72
	Total number of feet of pipe laid,		51,737
Number of feet of new pipe laid,		4	11,593
"	"	6	33,430
"	"	10	144
"	"	36	6,570
	Total number of feet,		51,737

Or 9 miles 4,217 feet.

Fourth District.

Account of Iron Pipes laid in the Thirteenth, Fourteenth, Fifteenth, Twentieth, Twenty-first and Twenty-eighth Wards.

Street.	Location.	Size. Inches.	Feet.
Lehigh ave.,	From Germantown avenue to Broad (both sides),	6	3,720
Twenty-sixth,	" Brown to Poplar,	6	600
Tioga,	" Seventeenth to Twenty-second,	6	2,364
Hutchinson,	" Jefferson to Oxford,	4	549
Dauphin,	" Eighth to Tenth,	6	780
Gratz,	" Montgomery avenue to Berks,	6	540
Twenty-eighth,	" Poplar to Girard avenue,	6	492
N'th College ave.,	" Twenty-first (west),	6	540
Wellington,	" Columbia avenue to Oxford,	6	240
Twenty-sixth,	" Poplar to Girard avenue,	6	492
Ninth,	" Germantown ave., to Dauphin,	6	828
Nassau, to connect with Twenty-first and Twenty-second,		6	24
Barclay, to connect with Hedding,		4	108

Street.	Location.	Size. Inches.	Feet.
Seventeenth,	From Jefferson to Oxford,	6	540
Poplar,	" Vineyard to Geary,	6	240
Jefferson,	" Seventeenth to Eighteenth,	6	480
Bouvier,	" Master to Jefferson,	6	504
Darien,	" Jefferson to Columbia avenue,	4	1,080
Uber,	" Norris to Berks,	6	504
Ninth,	" Jefferson to Oxford,	6	552
Nicholas,	" Nineteenth to Twentieth,	6	444
Nineteenth,	" Oxford to Montgomery,	6	1,128
Chauncey,	" Girard avenue to Stiles,	4	369
Croskey,	" Columbia to Montgomery,	6	564
Berks,	" Twentieth to Twenty-first,	6	528
Woodstock,	" Montgomery ave. to Norris,	6	1,128
Franklin,	" Susquehanna avenue (north),	6	204
"	" Montgomery avenue to Berks,	6	552
Sixteenth,	" Poplar to Cambridge,	6	228
Nineteenth,	" Master to Jefferson,	6	540
West College ave.,	" Girard avenue (north),	6	456
Carlton,	" Eighteenth to Nineteenth,	4	459
Arizona,	" Dauphin to York,	6	468
Darien,	" Montgomery ave., to Berks,	4	549
Township line,	" Tioga to Venango,	6	756
Plug connections,		4	216
Pumping main, from Twenty-ninth and Master to Twenty-first and Jefferson,		30	3,800
Repairing main at Fairmount,		36	158
" " "		23	16
Shifting pipe, North College avenue,		16	12
" " " " "		10	12
Pumping main, Thompson street (omitted in report of 1869),		36	1,272
Submerged main, below Columbia bridge,		36	963
Total number of feet of pipe laid,			29,999

	Size. Inches.	Feet.
Number of feet of new pipe laid,	36	2,393
" " " "	30	3,800
" " " "	23	16
" " " "	16	12
" " " "	10	12
" " " "	6	20,436
" " " "	4	3,330
Total number of feet of new pipe laid,		29,999

Or 5 miles 3,599 feet.

Germantown.

Account of Iron Pipes laid in Germantown, Twenty-second Ward.

Street.	Location.	Size. Inches.	Feet.
Germantown ave.,	From terminus of pipe, S. E. to Cayuga,	6	785
Cayuga,	" Germantown avenue to Seventeenth,	6	1,074
Wister,	" End of pipe east,	3	566
East Walnut lane,	" Germ'town ave. to Morton,	4	742
Linden,	" Greene to Wayne,	4	1,014
Rittenhouse,	" Former terminus to Wayne,	6	686
Wayne,	" Former terminus to Rittenhouse,	6	300
Seymour,	" Germantown ave. to west line of Green,	6	968
Knox,	" Queen to Linden,	4	384
West Wash'ton lane,	" Adams (east),	4	183
Adams,	" Terminus to Tulpehocken,	6	305
Winona avenue,	" Wayne (west),	4	295
Wayne,	" Coulter to School,	4	745
Greene,	" School (south),	6	253
"	" Chelton ave. (south),	6	84

Street.	Location.	Size. Inches.	Feet.
Chelton ave.,	From Greene (east),	4	200
"	" " (west),	4	580
Mechanic,	" Humes to Morton,	4	1,020
East side Wissahickon, from former terminus to abutment of bridge,		20	298
West side Wissahickon,		20	695
Waste for Wissahickon pipe bridge,		4	114
Intersections,		4	66
Connections,		3	21
"		4	305
Total number of feet of pipe laid,			11,683
Number of feet of new pipe laid,		20	993
" " "		6	4,455
" " "		4	5,648
" " "		3	587
Total number of feet of pipe laid,			11,683

Or 2 miles 1,123 feet.

Manayunk.

Street.	Location.	Size. Inches.	Feet.
Cresson,	From Cedar to East,	6	924
East,	" Cresson to Wood,	4	648
Conneetion, Cresson and Shurs lane,		6	72
Total number of feet of pipe laid,			1,644
Number of feet of new pipe laid,		6	996
" " "		4	648
Total number of feet of new pipe laid,			1,644

Recapitulation of Pipe laid in the several Districts during the year 1870.

WARDS.	3-inch.	4-inch.	6-inch.	8-inch.	10-inch.	12-inch.	16-inch.	20-inch.	23-inch.	30-inch.	36-inch.	TOTAL
1st District, 1, 2, 3, 4, 26	.....	9,466	11,222	.....	.....	.....	.....	.....	.....	.....	.....	20,688
2d " 5, 6, 7, 8, 9, 10, 24, 27	.....	2,422	16,607	1,990	.....	1,059	.....	1,214	.....	190	.....	23,482
3d " 11, 12, 16, 17, 18, 19, 23, 25	.....	11,593	33,430	.....	144	.....	.....	.....	.....	.....	6,570	51,737
4th " 13, 14, 15, 20, 21, 28	.....	3,330	20,436	.....	12	.....	12	.....	16	3,800	2,393	29,999
Germantown, 22	587	5,648	4,455	.....	.....	.....	.....	993	.....	.....	.....	11,683
Manayunk	.....	648	996	.....	.....	.....	.....	.....	.....	.....	.....	1,644
Total	587	33,107	87,146	1,990	156	1,059	12	2,207	16	3,990	8 963	139,233

Being a total of 26 miles 1,953 feet.

Total number of feet of pipe, as per last report..... ...2,439,914
" " " " laid during the year..... 139,233

Feet 2,579,147

Or 488 miles 2,507 feet.

Iron Mains laid in different cities of the United States up to December 31, 1869.

Philadelphia,	462	Miles.
New York,	321	"
Brooklyn,	237	"
Chicago,	208	"
Baltimore,	193	"
Boston,	170	"
Cincinnati,	121	"
Jersey City,	71	"
Louisville,	53	"

SERVICE MAINS ORDERED.

Councils have ordered pipe laid in the following streets.

First District.

Pipe ordered to be laid in the First District.

Streets.		Location.
Tenth,	From	Winton to Jackson.
Moore,	"	Tenth to Broad.
Twentieth,	"	Federal to Wharton.
Dickerson,	"	Bancroft to Seventeenth.
Twenty-fourth,	"	Alter to Federal.
Fitzwater,	"	Twenty-second to Twenty-third.
Hummell,	"	Grays Ferry Road to Twenty-ninth.
Otsego,	"	Mifflin to McKean.

Second District.

Pipe ordered to be laid in the Second District.

Street.		Location.
Thirty-seventh,	From	Garden to Aspen.
Baltimore avenue,	"	Forty-first to Forty-second.
Thirty-seventh,	"	Lancaster avenue to Warren.
"	"	Darby road to Sycamore.

Street.		Location.
Sycamore,	From	Thirty-fifth to Thirty-seventh.
Westminster avenue,	"	Lancaster avenue to Forty-eighth.
Thirty-third,	"	Haverford to Bridge.
Forty-fifth,	"	Huron to Transcript.
Lex,	"	" "
Forty-first,	"	Elm to Pennsylvania R. R. Bridge.
Pine,	"	Thirty-ninth to Fortieth.
Forty-fifth,	"	Oregon to Transcript.
Rockland,	"	Thirty-third to Thirty-fourth.

Third District.

Pipe ordered to be laid in the Third District.

Street.		Location.
Toronto,	From	Melvale, South 806 feet.
Berks,	"	Front to Germantown avenue.
Ann,	"	Emerald to Kensington avenue.
Wellington,	"	Richmond to Cedar.
Thompson,	"	Lehigh avenue to Reading R. R.
Ormes,	"	Somerset to Cambria.
Edgemont,	"	York to Cumberland.
Thompson,	"	William to Clearfield.
Bodine,	"	Dauphin to Susquehanna.
Montgomery avenue,	"	Second to Bodine.
Lawrence,	"	Norris to Hackley.
Almendo,	"	Somerset to Ann.
Emerald,	"	Cemetery avenue to Clearfield.
Mutter,	"	Lehigh avenue to Cumberland.
Waln,	"	Mulberry to Unity.
Bath,	"	Sorrell to Ann.

Fourth District.

Pipe ordered to be laid in the Fourth District.

Street.	Location.
Master,	From Twenty-seventh to Twenty-eighth.
Lehigh ave.,	" Sydenham to Eighteenth.
Thirteenth,	" Berks to Susquehanna avenue.
Cadbury (or Park) ave.,	From Montgomery to Berks.
Twenty-fifth,	From Brown to Hare.
Tioga,	" Seventeenth to Broad
Berks,	" Nineteenth to Twentieth.
"	" Twenty-first to Ridge avenue.
Tahassa,	" Ninth to Tenth
Taney,	" Brown to Poplar.
Eighth,	" Berks to Dauphin.
Seventeenth,	" Columbia to Montgomery.
Nassau,	" Twenty-seeond to Twenty-third.
Seventeenth,	" Allegheny to Tioga.
Stewart,	" Twenty-first to Twenty-third.
Diamond,	" Broad to Tenth.
Jefferson,	" Eighteenth to Twenty-sixth.
Institute,	" Columbia to Berks.

GERMANTOWN.

Pipe ordered to be laid in Germantown, Twenty-second Ward.

Street.	Location.
Township Line road,	to connect with pipe now laid in the Twenty-eighth Ward.
Stenton avenue,	From terminus of pipe to Germantown avenue.
School lane,	" End of pipe along School lane to Ridge avenue, and along Ridge avenue to Falls bridge, as soon as the connection shall have been made between the Roxborough Water Works and the Mount Airy Reservoir.

MANAYUNK.

Pipe ordered to be laid in Manayunk.

Street.	Location.
Wood,	From Green lane to Cotton.
Church street.	

Length of Pipe laid since Consolidation.

YEARS.	MILES.	FEET.
1855	6	44
1856	10	2,079
1857	12	324
1858	13	3,484
1859	22	784
1860	19	224
1861	11	2,368
1862	9	954
1863	10	4,161
1864	6	4,287
1865	8	4,754
1866	12	2,964
1867	15	4.971
1868	15	148
1869	22	1,884
1870	26	1,953
Total, - - -	222	3,703

Account of the number of Holes drilled for making new Attachments to Public Mains during the year 1870.

MONTHS.	½ inch diameter.	⅝ inch diameter.	¾ inch diameter.	1 inch diameter.	Total holes drilled and attachments made.	Shut off for repairs to private pipes.	Shut off for repairs to public pipes.
January	177	7	3	1	188	16	13
February	99	16	2	1	118	16	22
March	225	13	3	2	243	21	23
April	318	28	4	5	355	36	29
May	462	20	5	1	488	41	30
June	390	20	5	4	419	29	35
July	440	14	4	.....	458	17	33
August	429	24	10	2	465	23	29
September,	482	24	11	5	522	24	37
October	460	39	7	1	507	33	30
November	598	10	10	6	624	38	28
December	294	10	6	4	314	34	34
Total	4,374	225	70	32	4,701	328	334

The following Attachments were made in the Wards:

WARDS.	½ inch diameter.	⅝ inch diameter.	¾ inch diameter.	1 inch diameter.	Total holes drilled and attachments made.	Shut off for repairs to private pipes.	Shut off for repairs to public pipes.
First District, 1, 2, 3, 4, 26	1,129	12	1	.....	1,142	38	56
Second District, 5, 6, 7, 8, 9, 10, 24, 27	580	91	28	11	710	110	8
Third District, 11, 12, 16, 17, 18, 19, 23, 25.	1,403	19	14	6	1,442	85	143
Fourth District, 13, 14, 15, 20, 21, 28.	1,128	97	25	14	1,264	91	112
Germantown	97	5	2	1	105	4	15
Manayunk	37	1	.....	.....	38	.....	.....
Total	4,374	225	70	32	4,701	328	334

The following Table exhibits the number of repairs to Mains, Stops, Plugs, by different Districts, during the year 1870.

DISTRICTS.	Repairs to mains.	Repairs to stops.	Repairs to plugs.
First District, - - -	56	228	345
Second " - - -	8	230	135
Third " - - -	133	403	511
Fourth " - - -	112	340	453
Germantown, - - -	12	38	29
Manayunk, - - - -	1	13	. . . . .
Total, - - - -	322	1,252	1,473

Account of New Stops and Fire-plugs for 1870.

DISTRICTS.	No. of stops.	No. of fire-plugs.
First District, - - - - - - - -	43	30
Second " - - - - - - - -	67	45
Third " - - - - - - - -	118	72
Fourth " - - - - - - - -	46	21
Germantown, - - - - - - - -	19	18
Manayunk, - - - - - - - -	2	3
Total, - - - - - - - -	295	189

Statement of the number of Fire Plugs in the different Wards.

First District.				
First	Ward,	-	186	
Second	"	-	151	
Third	"	-	87	
Fourth	"	-	86	
Twenty-sixth	"	-	232	
				742
Second District.				
Fifth	Ward,	-	133	
Sixth	"	-	113	
Seventh	"	-	147	
Eighth	"	-	149	
Ninth	"	-	149	
Tenth	"	-	114	
Twenty-fourth	"	-	193	
Twenty-seventh	"	-	121	
				1,119
Third District.				
Eleventh	Ward,	-	86	
Twelfth	"	-	100	
Sixteenth	"	-	112	
Seventeenth	"	-	98	
Eighteenth	"	-	205	
Nineteenth	"	-	433	
Twenty-third	"	-	106	
Twenty-fifth	"	-	109	
				1,249
Fourth District.				
Thirteenth	Ward,	-	104	
Fourteenth	"	-	90	
Amounts carried forward,		-	194	3,118

Amounts brought forward, - -	194	3,118
Fifteenth Ward, - - - -	225	
Twentieth " - - - -	320	
Twenty-eighth " - - - -	31	
		770
Manayunk, Twenty-first Ward, - -		54
Germantown, Twenty-second " - -		165
Total fire plugs in all the wards, -		4,099

The following shows the number of attachments made in the different districts, for fire purposes only, in places of public amusement, hotels, manufactories, &c.:

First District, - - -	42
Second " - - - -	11
Third " - - - -	21
Fourth " - - - -	23
Germantown, - - - -	1
Total, - - - -	98

There are now 38 public drinking fountains supplied by the department free of charge; 32 erected by the Fountain Society; 6 erected by the Society for Prevention of Cruelty to Animals.

RECEIPTS AND EXPENDITURES.

Receipts.

The gross receipts for the year have been $935,370 96. The sources from which this amount has been received will be exhibited by the statement of the Register, George F. Keyser, Esq.

Of the above sum, $7,335 01 has been received at the Engineer's office.

The following amounts have been received at the Chief Engineer's office, and paid to the City Treasurer:

For Rents, - - - - - -	$1,010 00
Old iron, &c., - - - - -	1,315 70
Stone, - - - - - -	2,359 42
Repairs to private fire plugs, - - -	99 35
Grass, - - - - - -	126 57
Cement and oil barrels, - - -	104 00
Sand, - - - - - -	25 00
Wharfage, - - - - -	120 00
Old Engine, - - - - -	50 00
Lead dross, - - - - -	20 00
From Oakdale Park, for 3-inch attachment, -	112 00
Philadelphia and Trenton R. R., for 4-inch attachment, - - - -	201 97
H. Winsor & Co., for 4-inch attachment, -	214 35
Vezin, Hall & Vezin, for 4-inch attachment,	155 00
Green and Coates Streets Passenger Railway Company, for 4-inch attachment, - -	241 39
Frazier & Rogers (2), for 3-inch attachment,	235 72
Frankford Arsenal, for 4-inch attachment, -	166 54
Isaac Stead, " " -	127 90
H. Disston & Son, " " -	216 44
Garsed & Winpenny, " " -	110 22
W. C. Allison, for removing fire plug, -	83 60
C. T. Parry, " " " -	37 68
I. Lang, for damages to water-pipes, - -	92 16
Nixon & Stokes, for use of fire plug, - -	75 00
T. A. Andrews, for old balustrade railing, -	25 00
For Goose Neck, - - - - -	10 00
	$7,335 01

PERMITS ISSUED FOR THE YEAR 1870.

WARDS.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21 & 28	22	23	27 & 24	25	26	Total.
Dwellings	465	55	29	10	4	7	47	31	17	55	3	6	5	13	241	10	24	137	869	739	198	89	76	332	100	499	4,061
" ½ and ¾	1	1	... ..	1	.....	.....	.....	.....	.....	.....	.....	.....	....	4	7	3	2	4	.....	4	.....	.....	2	2	.....	.....	31
Baths	126	30	20	6	2	9	59	48	18	81	9	8	10	24	182	15	21	54	388	472	90	68	24	207	17	221	2,218
Wash-paves	68	28	18	7	3	12	45	32	24	65	6	8	19	20	153	19	9	32	139	550	74	25	41	124	13	110	1,644
Water closets and urinals	14	4	12	2	31	120	60	120	30	162	1	7	36	52	124	11	2	2	17	230	50	42	5	137	.....	14	1,285
Basins, sinks and tubs	5	1	3	1	15	60	127	126	34	182	4	4	30	39	167	13	3	9	7	294	27	32	2	167	.....	4	1,347
Steam engines	2	2	1	.....	7	8	.....	3	3	5	3	2	.....	1	7	1	.....	.....	17	7	.....	3	1	5	....	.....	78
Horse-power	11	11	6	....	45	107	.....	8	25	30	47	13	.....	15	72	12	.....	.....	298	75	.....	16	1	80	.....	.....	872
Stores, shops and offices	3	3	1	1	3	10	1	2	7	2	6	...	2	5	6	2	1	2	7	14	.....	1	1	.....	.....	2	82
Building permits	16	6	3	1	1	3	6	10	5	16	3	2	2	7	5	4	2	11	84	57	13	22	13	76	15	20	404
Stables	5	3	1	.....	1	2	3	11	1	6	1	1	1	3	12	2	2	3	12	20	1	7	3	5	1	7	114
Hotel bars	2	2	.....	1	1	8	2	5	6	5	1	3	4	2	4	3	2	2	21	13	1	1	.....	6	3	7	105
Barber shops	1	..	.....	.....	2	1	.....	.....	2	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	3	....	. ....	12
Watering horses	3	.....	.....	.....	2	1	1	.....	1	.....	3	.....	.....	1	1	1	....	1	4	2	.....	.....	.....	2	1	1	25
Factories	3	1	.....	.....	2	4	1	.....	1	3	.....	1	.....	1	2	1	.....	2	9	2	.....	1	1	4	.....	.....	39
Fountains	.....	1	.....	.....	.....	1	.....	3	.....	2	.....	1	2	1	2	1	....	.....	.....	3	1	1	.....	4	.....	4	27
Bakeries	.....	.....	1	....	1	.....	.....	2	.....	.....	.....	.....	.....	.....	1	.....	.....	1	2	1	.....	.....	.....	2	1	.....	12
Distilleries	.....	.....	....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Rectifiers	.....	.....	.....	.....	1	1	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Schools and churches	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....	.....	4
Hot-houses	.....	.....	.....	.....	.....	.....	.....	.....	....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	'	1	.....	.....	1	.....	.....	5
Dye houses	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	....	3	.....	1	3	.....	.....	.....	.....	9
Foundries	. ...	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Market houses	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Slaughter-houses	.....	.....	.....	.....	... ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	....	1	.....	.....	.....	.....	1	.....	.....	4
Breweries	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	... ...	.....	1	.....	.....	.....	.....	.....	.....	2
Hospital	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Brick yards	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	2
Marble yard	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Bleach-house	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Malt house	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Skating-parks	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	2
Watering streets	.....	.....	.....	.....	4	4	.....	4	4	4	2	.....	3	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	33
Total	726	148	95	39	126	358	352	406	179	620	89	56	114	184	904	99	74	260	1879	2491	469	311	170	1160	151	889	12,430

DEPARTMENT FOR SUPPLYING THE CITY WITH WATER,
Register's Office, No. 104 S. Fifth street.

PHILADELPHIA, *January*, 1871.

FREDERIC GRAFF, ESQ.,

Chief Engineer Water Department.

DEAR SIR:—I respectfully submit the following statements of the operation of this office for the year 1870.

The tabular statement presents to you in detail a full report of the financial operation, together with estimated receipts from all sources for 1870, which was $911,000 00.

By reference to the statement, you will find they amount in the aggregate to $928,035 95; an excess over the total receipts for the years 1869, of $119,527 72.

Annexed are the amounts of duplicates, arranged by wards, for the years 1870 and 1871, also, a list of permits granted during the year, together with a tabular statement of dwellings, &c., as charged in the Registers, for 1871.

The total amount of delinquent pipe bills returned to the Survey Department for lien, during the year (1870), was $61,640 99.

Yours, very respectfully,

GEORGE F. KEYSER,

Register.

Amount of Duplicates for the years

Wards.	1870.	1871.
First,	$30,328 00	$33,470 25
Second,	31,376 50	32,214 50
Third,	17,853 50	18,261 00
Fourth,	18,778 25	18,827 75
Fifth,	31,654 00	32,761 50
Sixth,	36,686 55	34,735 75
Seventh,	35,852 00	38,459 25
Eighth,	37,023 75	36,412 50
Ninth,	33,988 00	34,254 50
Tenth,	31,032 00	32,645 75
Eleventh,	17,984 75	18,045 75
Twelfth,	19,576 75	19,768 75
Thirteenth,	28,085 50	28,321 75
Fourteenth,	31,250 00	32,017 75
Fifteenth,	64,416 25	67,202 50
Sixteenth,	22,409 75	22,809 25
Seventeenth,	20,770 25	22,090 50
Eighteenth,	28,156 00	29,476 50
Nineteenth,	51,167 75	58,578 25
Twentieth,	79,803 50	88,530 50
Twenty-first, Twenty-eighth,	7,319 00	8,865 50
Twenty-second,	12,284 00	13,268 00
Twenty-third,	3,086 50	3,771 00
Twenty-fourth, Twenty-seventh,	28,089 50	16,982 75
Twenty-fifth,	6,376 25	7,213 25
Twenty-sixth,	38,663 00	44,998 50
Twenty-seventh,	. . . . .	16,065 25
Totals,	$764,011 30	$810,048 50

List of Dwellings, Factories, &c., &c., as charged on Registers of 1870.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21 & 28	22	23	24 & 27	25	26	Total.
Dwellings	5500	3684	1883	1824	2749	2767	3486	2702	2459	2773	2356	1906	2564	3091	5699	1937	2108	3309	6738	8398	817	1013	360	2436	829	5428	78,867
Three quarter dwellings	84	224	110	105	28	32	125	41	76	74	232	42	61	170	980	150	150	480	471	284	3	....	2	55	72	60	4,111
Half dwellings	397	1350	1282	1471	515	293	1220	534	435	991	735	711	558	639	393	1225	529	593	628	497	11	7	3	74	239	490	15,820
Baths	1215	874	579	388	806	9	1884	1913	1198	1611	407	781	1641	1561	3259	401	279	527	898	4935	579	806	97	1162	114	1471	18,030
Wash paves	342	329	262	113	534	315	984	1055	886	1020	176	425	902	1032	2363	277	212	345	676	3907	521	330	155	626	105	713	29,395
Water-closets, Biddetts & urinals	42	41	57	62	1270	1495	998	1824	1351	876	135	117	324	230	1436	49	19	13	134	1190	333	536	12	665	11	157	13,380
Basins, sinks & wash-tubs	15	41	62	67	1246	1349	1127	2059	1829	1005	143	224	428	284	3201	109	28	37	137	1900	137	458	47	502	12	119	15,536
Horse power	553	578	87	190	593	1033	324	133	842	267	408	244	227	516	1927	1141	394	520	1591	536	27	333	139	429	68	388	13,488
Bars	86	138	75	185	249	156	82	96	156	58	253	101	72	46	193	122	.....	69	205	178	4	12	6	94	54	153	2,845
Watering horses	19	8	9	8	16	1	11	.....	19	5	.....	.....	1	5	8	1	10	66	6	.....	.....	.....	6	26	6	46	298
Factories	5	6	....	2	2	39	21	.....	36	9	.....	13	11	26	2	31	34	2	97	10	.....	5	1	32	.....	.....	372
Fountains	.....	1	1	.....	10	14	2	17	25	18	.....	6	6	10	27	4	.....	3	2	17	1	12	1	47	1	7	232
Horse stalls	421	819	299	438	517	400	631	1469	1339	707	686	633	597	677	1750	641	182	442	958	1672	54	28	116	1002	113	653	17,283
Bakeries	25	37	29	21	14	19	10	9	25	9	13	16	12	15	41	30	17	14	83	42	4	6	3	26	5	26	551
Dye tubs	.....	7	.....	.....	6	....	35	1	....	14	.....	.....	3	.....	61	41	42	24	61	5	5	20	.....	.....	16	15	359
Meat-packers	4	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8
Foundries	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
Breweries	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	3	5	18	.....	.....	33	.....	3	.....	.....	3	1	72
Sugar-houses	.....	2	.....	1	1	2	.....	.....	.....	2	1	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	11
Distilleries	.....	.....	.....	1	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	10
Slaughter-houses	3	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	5	11	.....	.....	2	.....	5	29	.....	.....	.....	.....	.....	1	57
Hot-houses	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	11	.....	.....	1	.....	.....	17
Malt-houses	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	4	.....	.....	.....	.....	.....	.....	7
Brick-yards	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....	.....	.....	.....	.....	7
Barber shops	1	15	13	....	23	16	1	7	38	8	.....	11	10	17	18	20	23	9	52	12	1	2	3	18	3	....	320
Drug stores, offices & shops	3	3	3	1	4	10	1	5	27	8	6	11	5	12	26	10	1	2	49	19	2	1	5	18	3	12	247
Photographers	.....	.....	1	.....	6	11	.....	8	21	2	5	2	6	2	1	.....	.....	.....	18	2	..	1	.....	5	.....	.....	91

Statement of Receipts at Register's Office, from January 1 to December 31, 1870.

MONTHS.	Delinquent Rents.	Penalties.	Rents, 1870.	Penalties.	Permits.	Water pipe.	Totals.
January	$9,635 50	$1,102 65	$37,311 50		$2,321 25	$27,292 16	$77,661 06
February	2,185 75	274 50	53,470 00		2,027 00	4,804 60	62,761 85
March	1,977 50	265 65	116,968 00		3,686 75	7,218 14	130,116 04
April	2,267 50	278 41	358,158 55		4,931 25	7,372 39	373,008 10
May	1,104 75	131 62	31,715 50	$1,463 86	5,192 00	5 317 56	144,925 29
June	586 50	64 14	40,161 50	1,925 11	4,727 00	9,399 34	56,863 59
July	355 50	32 48	7,564 00	1,023 49	4,117 25	10,788 75	23,881 47
August	155 50	19 62	17,137 75	2,347 06	3,893 25	11,291 71	34,844 89
September	579 75	75 03	28,288 33	3,763 96	4,361 00	11,102 73	48,170 80
October	1,000 50	69 02	18,195 50	2 331 15	3,208 65	7 043 07	31,847 89
November	1,369 75	139 21	12,286 25	1,490 82	3,582 75	7.782 55	26,651 33
December	560 50	59 12	13,624 25	381 65	4,772 00	7,906 12	17,303 64
Total	$21,777 00	$2,511 45	$724,881 13	$14,727 10	$46,820 15	$117,319 12	$928,035 95

RECEIPTS AND EXPENDITURES SINCE CONSOLIDATION.

YEARS.	Received by Register for water-rents and per-centage.	Received by Chief Engineer for rents, old iron, scraps, and private fire-plug attachments.	Total receipts from all sources.	Yearly increase.	Total expenditures.
1855.....	$381,410 17	$626 55	$382,036 72	.....	$250,895 37
1856.....	351,936 49	960 11	352,896 60	Decrease.	160,368 02
1857.....	425,661 94	302 20	425,964 14	$73,067 54	200,605 82
1858.....	457,518 48	129 75	457,648 23	31,684 09	187,978 09
1859.....	548,128 19	3,051 89	551,180 08	93,531 85	411,737 09
1860.....	557,121 76	1,409 77	558,531 53	7,351 45	252,506 23
1861.....	533,094 76	885 30	533,980 06	Decrease.	238,989 54
1862.....	544,767 25	1,025 82	545,793 07	11,813 01	177,271 69
1863.....	568,740 60	937 69	569,678 29	23,885 22	213,750 20
1864.....	609,257 28	855 29	610,112 57	40,434 28	253,968 75
1865.....	629,887 47	6,500 95	636,388 42	26,275 85	422,337 58
1866.....	666,294 95	3,927 18	670,222 13	33,833 71	616,712 92
1867.....	761,559 45	5,891 44	767,450 89	96,228 76	575,844 49
1868.....	772,605 76	4,404 83	777,009 59	9,558 70	802,217 46
1869.....	808,508 23	4,962 60	813,470 83	36,461 24	909,768 28
1870.....	928,035 95	7,335 01	935,370 96	121,900 13	1,144,073 51

Expenditures of the Department for the year 1870.

Salaries of Chief Engineer, Register, Clerks, &c.,		$28,711 84
Office expenses,		3,777 95
Salaries of Engineers, Firemen, &c., at works,		31,669 75
Supplies to works, viz.:		
Coal and wood,		60,514 53
Tallow, oil and gas,		4,878 31
Small stores, packing, &c.,		2,828 37
Repairs to works, viz.:		
Fairmount works,	$7,561 80	
Delaware "	3,387 90	
Schuylkill "	4,183 99	
24th Ward "	2,499 82	
Germantown "	1,114 64	
Roxborough "	947 58	
		19,695 73
Keeping grounds in order:		
Hardware,	14 75	
Plants,	35 00	
Bricklaying,	55 25	
Wages,	1,894 76	
		1,999 76
Buildings, grounds and reservoirs:		
Lumber,	1,744 66	
Tin Roofing,	501 47	
Plastering,	313 30	
Hardware,	172 45	
Painting and glazing,	499 53	
Bricklaying,	264 67	
Plumbing,	134 10	
Sash and frames,	120 60	
Flag stone,	436 20	
Paper hanging,	81 62	
Relaying track,	292 00	
T Rail,	83 23	
Amounts carried forward,	$4,653 77	$154,076 24

Amounts brought forward, -	$4,653 77	$154,076 24
Repairing scales, - -	250 75	
Dredging, - - -	2,685 56	
Repairs to wharf, - -	653 70	
Lime and cement, - -	98 44	
Wrought iron beams, -	37 00	
Sand, - - -	27 00	
Slating, - - -	20 05	
Rope, &c, - - -	36 47	
Wages, - - -	11,057 05	
Sundry bills, - -	224 75	
		19,734 60
Iron pipes, fire plugs, and other fixtures, and materials for laying pipes, &c.:		
Iron pipes, - - -	115,957 51	
Iron castings, - -	10,655 00	
Brass castings, - -	3,199 50	
Lead, - - -	8,505 55	
Wrought iron and steel, -	1,124 17	
Hardware, - - -	2,048 69	
Coal, - - -	706 75	
Bolts and washers, -	1,462 48	
Lumber, - - -	1,467 68	
Leather, - - -	266 43	
Gasket and rope, - -	1,001 18	
Galvanizing spindles, -	192 18	
Blower, - - -	123 50	
Tubing, - - -	440 82	
Paints and oils, - -	389 37	
Machine work, - -	311 68	
Wharfage, - - -	91 00	
Stop cock pattern, - -	199 87	
Rents, - - -	178 00	
Belting, - - -	18 87	
Sundry bills, - -	311 49	
		149,651 72
Amount carried forward, - -		$323,462 56

Amount brought forward, - -		$323,462 56
Labor, laying pipe, setting plugs, &c., and for fitting up stop cocks, &c. viz.:		
First district, - - -	5,389 70	
Second " - - - -	7,782 36	
Third " - - - -	10,764 47	
Fourth " - - - -	6,291 51	
Germantown, - - -	3,611 49	
Manayunk, - - -	1,127 61	
		34,967 17
Shop, viz.:		
Wages, - - - -	16,045 42	
Surveyors, for measuring pipe, -	3,166 84	
Pipe plans, - - - -	1,354 75	
Dressing tools, - - -	53 20	
Powder and fuse, - - -	63 61	
Paving around plugs, - -	422 75	
Hauling pipe, - - -	651 00	
Lumber, - - - -	237 94	
Sundry bills, - - -	104 93	
		22,100 44
Keeping pipes, plugs, stops and fixtures in good order, viz.:		
Wages, First district, - -	4,224 20	
" Second " - - -	5,178 25	
" Third " - - -	8,727 25	
" Fourth, " - - -	6,209 99	
" Germantown, - -	871 70	
" Manayunk, - -	351 86	
Paving around plugs, - -	1,131 50	
Plumbing, - - - -	17 30	
Drain pipe, - - - -	354 90	
Sundry bills, - - -	91 00	
		27,157 95
Amount carried forward, -		$407,688 12

Amount brought forward, - -		$407,688 12
Drilling and making new attachments, viz.:		
Wages, First district, - -	1,379 25	
" Second " - - -	1,408 50	
" Third " - - -	1,750 25	
" Fourth " - - -	2,486 50	
" Germantown, - -	234 50	
" Manayunk, - -	126 00	
		7,385 00
Iron railing, Fairmount, - - -		268 26
Carriage hire and keep of horse for use of Chief Engineer, - - - - -		648 81
Germantown Water Company, - - -		5,000 00
For boilers and connections at Schuylkill Works in place of old and worn out boilers in south boiler house:		
Boilers, &c., - - -	13,201 20	
Cement, - - - -	247 83	
Bricklaying, - - -	2,623 37	
Lumber, - - - -	202 86	
Wrought iron beams, - -	144 75	
Lime, - - - -	108 30	
Stone, - - - -	583 41	
Fire Brick, - - -	839 00	
Bricks, - - - -	993 70	
Powder, &c., - - -	51 56	
Rope, - - - -	82 23	
Wages, - - - -	5,879 14	
		24,957 35
Bills of twice-paid and over paid water rents, - - - - -		123 75
For the relief of Mary E. Carter, widow of Richard D. Carter, late in the employ of the Water Department,		1,000 00
Amount carried forward, - -		$447,071 29

Amount brought forward, - -		$447,071 29
Assisting to keep up the supply of water:		
Wages, - - - -	628 49	
Lumber, - - - -	53 10	
Advertising, &c., - - -	92 95	
		774 54
To pay expert or experts, &c., in suit of Schuylkill Navigation Co. *vs.* City:		
Experts, - - - -	600 00	
Witness fees, - - -	28 00	
Depositions, - - -	100 00	
Subpœnaes, &c., - - -	31 00	
		759 00
		$448,604 83

EXTENSIONS OF WORKS.

Amounts Paid from Water Loans.

Item 1.

For engine house, foundations, stack, wharf, tunnel, coal sheds, scales, boiler setting, grading, &c., Belmont Water Works:		
Cap and cornice, - - -	$1,650 00	
Fire brick, - - - -	324 00	
Hardware, - - - -	70 71	
Lumber, - - - -	345 43	
Cement, - - - -	103 50	
Lightning rod, - - -	68 40	
Dressing tools, - - -	15 54	
Machine work, - - -	131 12	
Sash, &c., - - - -	31 20	
Sundry bills, - - -	30 66	
Wages, - - - -	2,079 01	
		4,849 57

Item 2.

For boilers and connections, Belmont Water Works:		
Boilers (reservation), - -		2,500 00

Item 3.

For reservoir, Belmont Water Works:		
Lime, &c., - - - -	$949 45	
Coping, - - - -	635 29	
Gravel, - - - -	954 10	
Powder and fuse, - - -	94 77	
Oil, - - - -	34 75	
Amounts carried forward, - -	$2,668 36	$7,349 57

Amounts brought forward, -	$2,668 36	$7,349 57
Railroad tickets for laborers, -	122 50	
Hardware, - - - -	15 00	
Barrows, - - - -	36 00	
Bricks, - - - -	36 25	
Dressing tools, - - -	877 15	
Iron pipe, - - - -	794 55	
Sluice gates, &c., - - -	1,508 40	
Wages, - - - -	26,787 50	
Sundry bills, - - -	47 69	
		32,893 40

Item 4.

For a 20-inch main on Lancaster avenue, from Belmont ave. to Fortieth street:

Stop cock, - - - -	$229 16	
Hauling mains, - - -	204 00	
Wages, - - - -	1,974 34	
		2,407 50

Item 6.

For the completion of the engine house, grading, scales, coal sheds, &c., Roxborough Water Works:

Lumber, - - - -	$77 65	
Wages, - - - -	56 31	
		133 96

Item 7.

For repairs to Mount Airy reservoirs:

Lumber, - - - -	423 36	
Sand, - - - -	120 00	
Cement, - - - -	605 15	
Hardware, - - - -	39 13	
Amounts carried forward, - -	$1,187 64	$42,784 43

Amounts brought forward, -	$1,187 64	$42,784 43
Fence, - - - -	53 75	
Bricks, - - - -	15 60	
Rope, - - - -	121 40	
Sundry bills, - - -	37 93	
Wages, - - - -	16,133 21	
		17,549 53

Item 8.

For engine, boilers and connections, boiler house, and alterations and additions to engine foundations, Schuylkill Water Works:

Boilers (reservation), - -	4,000 00	
Flag stones, - - -	227 23	
Lime, - - - -	165 32	
Wages, - - - -	425 50	
		4,818 05

Item 9.

For substituting turbine wheel in place of old breast wheels Nos. 4 and 5, Fairmount Water Works:

Iron castings, - - -	663 36	
Machine work, - - -	225 66	
Hardware, - - - -	66 83	
Lumber, - - - -	17 46	
Bricks, - - - -	4 50	
Coal, - - - -	150 00	
Hauling, - - - -	50 00	
Bricklaying, - - -	103 12	
Lime, - - - -	28 50	
Turbine wheel (reservation), -	7,559 28	
Sundry bills, - - -	36 12	
Wages, - - - -	5,026 75	
		13,931 58
Amount carried forward, - -		$79,083 59

Amount brought forward, - -		$79,083 59

Item 10.

For incidentals:

Machine work, - - -	1,622 10	
Flume (reservation), - -	500 00	
Felting, - - - -	392 70	
Hose, - - - -	351 15	
Hardware, - - - -	469 57	
Tallow and oil, - - -	169 57	
Lanterns, - - - -	32 80	
Drain pipe, - - -	14 97	
Steam gauge, - - -	30 00	
Sundry bills, - - -	163 30	
Siding (use of), - - -	11 00	
		3,757 16

Item 4.

For reservoir:

Wages, - - - -	75 30

Item 8.

For Cornish engine, boilers and connections:

Boilers (reservation on contract), -	$5,650 00	
Felting, - - - -	561 60	
Fire brick, - - - -	51 30	
Bricks, - - - -	28 00	
Sundry bills, - - -	73 43	
Lumber, - - - -	45 05	
Wages, - - - -	24 00	
		6,433 38
Amount carried forward, - -		- $89,349 43

Amount brought forward, - - -			$89,349 43

Item 9.

For engine house, foundation and stack:

Tin roofing, - - - -			1,122 85

Making and sinking a crib in front of Fairmount dam, through the deep water, and placing an oak apron upon it:

Wages, - - - - - -			103 07

Item 1.

For the purchase and laying a 16-inch, 12-inch and 10 inch main for Manayunk:

Wages, - - - - - -			119 37

Item 2.

For the purchase and laying a 20-inch main to connect the Roxborough Water Works with the Germantown Water Works:

Mains, - - - -	1,306 05		
Hardware, - - - -	12 25		
Packing, - - - -	39 00		
Machine work, - - -	40 03		
Pipe bridge, balance contract, -	51,879 11		
Sundry bills, - - -	72 08		
Wages, - - - -	1,322 56		
			54,671 08
Amount carried forward, - - -			$145,365 80

Amount brought forward, - -		$145,365 80

Item 3.

For the purchase and laying a 36-inch ascending main, from Schuylkill Water Works to the Spring Garden reservoir. (Authorized to purchase a 20-inch main for pipe bridge connecting Roxborough reservoir with Mount Airy reservoir, from this Item, as per ordinance Feb. 28, 1870 :)		
Mains (20-inch), - - -	19,447 69	
Inspecting main, - - -	235 10	
Hauling main, - - -	216 00	
Sundry bills, - - -	200 00	
Wages, - - - -	491 67	
		20,590 46

Item 4.

For the purchase and laying a 30-inch ascending and a 20-inch descending main for the Twenty-fourth Ward Water Works. (Authorized to draw warrants for building coal sheds, connecting railway from the Reading R. R. to the same, scales, grading, &c., at Belmont Water Works, as per ordinance Feb. 28, 1870 :)		
Roofing, - - - -	1,916 41	
Bricks, - - - -	1,451 70	
Tinwork, - - - -	284 22	
Hardware, - - - -	165 29	
Stone, - - - -	380 38	
Siding, &c., - - -	3,344 75	
Bricklaying, - - -	3,543 11	
Amounts carried forward -	$11,085 86	$165,956 26

Amounts brought forward,	$11,085 86	$165,956 26
Lumber, - - -	- 1,078 51	
Sand, - - -	- 71 50	
Cement, - - -	- 74 78	
Lime, - - -	- 567 10	
Painting, &c., - -	- 561 02	
Cresting, - - -	- 254 83	
Wood mouldings, - -	- 120 66	
Scale, - - -	- 140 00	
Machine work, - -	- 684 13	
Iron pipe, - - -	- 194 70	
Felting, - - -	- 62 25	
Towing, - - -	- 83 50	
Powder and fuse, - -	- 33 25	
Sundry bills, - -	- 186 40	
Wages, - - -	- 2,828 69	
		18,027 18
For the purchase and erection of two pumping engines for the Twenty-fourth Ward Water Works (now Belmont Water Works):		
Engine No. 1 (contract), -	- 47,500 00	
Engine No. 2 (account contract),	- 10,200 00	
		57,700 00

Item 1.

For engine and foundations at the Schuylkill Water Works, in place of old Engine No. 3:		
Cement, - - -	- 500 20	
Lime, - - -	- 28 50	
Brickwork, - -	- 289 74	
Machine work, - -	- 630 31	
Force pump, - -	- 300 00	
Amounts carried forward, -	$1,748 75	$241,683 44

Amounts brought forward,	- $1,748 75	$241,683 44
Granite, - - -	- 63 00	
Hardware, - - -	- 62 70	
Piles, - - -	- 155 00	
Gate hoist, - - -	- 253 78	
Lumber, - - -	- 904 11	
Sundry bills, - -	- 137 49	
Wages, - - -	- 6,289 29	
		9,614 12

Item 2.

For additional duplex engine at the Delaware Water Works:		
Engine (on account), - -		7,200 00

Item 3.

For ascending main, Belmont Water Works:		
Mains (on account), -	- 36,935 82	
Lead, - - -	- 2,405 36	
Gasket, - - -	- 184 68	
Lumber, - - -	- 102 64	
Hauling mains, - -	- 1,388 00	
Dressing tools, - -	- 108 00	
Hardware, - - -	- 21 75	
Railroad tickets, - -	- 262 50	
Sundry bills, - -	- 69 75	
Wages, - - -	- 6,679 92	
		48,158 42
Amount carried forward, - -		$306,655 98

Amounts brought forward, - - -		$306,655 98

Item 4.

For (on account) descending main from the Belmont reservoir, and for crossing the Schuylkill river mains (on account): - - -	$52,112 40	
Iron castings, - - -	1,218 56	
Lead, - - - -	4,876 31	
Gasket, - - - -	434 70	
Cheek valve, - - -	440 00	
Hauling mains, - - -	1,782 50	
Hardware, - - - -	142 42	
Rope, - - - -	61 50	
Lumber, - - - -	83 68	
Inspecting mains, - - -	768 80	
Contract, submerged main (on ace't),	20,000 00	
Dredging for " " - -	720 48	
Towing " " " -	1,366 50	
Sundry bills, - - -	112 45	
Wages, - - - -	9,787 39	
		93,907 69

Item 5.

For (on account) of pumping main, from the Delaware works to the reservoir:		
Mains, - - - -	$91,855 71	
Lumber, - - - -	443 28	
Gasket, - - - -	606 85	
Lead, - - - -	7,093 60	
Inspecting mains, - - -	314 00	
Castings, - - - -	290 00	
Hauling mains, - - -	802 50	
Brieklaying, - - -	382 05	
Hardware, - - - -	134 07	
Amounts carried forward,	$101,922 06	$400,563 67

Amounts brought forward, -	$101,922 06	$400,563 67	
Plumbing, - - - -	34 00		
Coke, - - - -	39 50		
Wharf builders' work, - -	956 30		
Sundry bills, - - -	75 00		
Wages, - - - -	20,216 06		
		123,242 92	

Item 6.

For pumping main, from the Schuylkill Water Works to the reservoir:			
Main, - - - -	7,232 93		
Hauling main, - - -	236 00		
Gasket, - - - -	162 00		
Wages, - - - -	35 00		
		7,665 93	

Item 7.

For substituting turbine wheel in place of the old breast wheels Nos. 6 and 7, at Fairmount Water Works:			
Turbine wheel (on account),	31,824 56		
Stone, - - - -	1,284 25		
Granite, - - - -	1,768 00		
Lumber, - - - -	1,236 15		
Iron beams (wrought), - -	261 25		
Sand, - - - -	194 20		
Cement, - - - -	1,777 62		
Lime, - - - -	135 28		
Castings, - - - -	1,559 84		
Machine work, - - -	2,174 00		
Brick work, - - -	851 87		
Wood mouldings, &c., - -	60 96		
Roofing felt, - - -	60 00		
Amounts carried forward, -	$43,187 98	$531,472 52	

Amounts brought forward,	$43,187 98	$531,472 52
Plastering,	97 00	
Coal,	143 65	
Hardware,	308 91	
Gum,	84 50	
Iron and steel,	395 88	
Plumbing,	40 40	
Brieks,	516 00	
Sundry bills,	138 33	
Wages,	15,008 70	
		59,921 35

Item 8.

For (on account) reservoir adjoining the present reservoir of the Delaware Water Works:		
Stone,	$729 64	
Lumber,	898 75	
Building tool house,	108 50	
Roofing "	15 36	
Cement,	64 62	
Lime,	39 80	
Gravel,	24 00	
Drain pipe,	66 30	
Hose,	53 50	
Watering cart,	140 00	
Hardware,	157 25	
Hauling stops,	94 00	
Survey of lot,	15 28	
Sundry bills,	135 51	
Wages,	54,375 22	
		56,917 73
Amount carried forward,		$648,311 60

Amount brought forward, -		$648,311 60

Item 9.

For enlarging the reservoir now building at Belmont Water Works:

Stone, - - - -	1,006 05	
Gravel, - - - -	340 90	
Dressing tools, - - -	616 80	
Lime, - - - -	154 00	
Lumber, - - - -	11 76	
Railroad tickets, - - -	175 00	
Sundry bills, - - -	12 87	
Wages, - - - -	26,131 96	
		28,449 34

Item 10.

For incidentals:

Advertising, - - -	95 40	
Sundries, - - - -	47 50	
		142 90

Item 1.

For new engine and pump, with foundation and inlet thereto, Roxboro' Works:

Iron Work, - - -	20 84	
Cement, - - - -	27 50	
Wages, - - - -	1,110 69	
		1,159 03

Item 2.

For new engine and boiler house, Roxborough:

Bricks, - - - -	144 00	
Flagging, - - - -	180 00	
Lumber, - - - -	204 27	
Hardware, - - - -	11 50	
Sash frames, &c., - - -	204 00	
Stone, - - - -	245 00	
Amounts carried forward,	$988 77	$678,062 87

Amounts brought forward, -	$988 77	$678,062 87
Brown stone, - - -	719 60	
Mason work, - - -	309 12	
Castings, - - - -	668 63	
Wages, - - - -	2,148 38	
		4,834 50

Item 3.

For necessary repairs to reservoir, Roxborough :		
Lime, - - - -	2,230 50	
Clay, - - - -	94 25	
Lumber, - - - -	45 60	
Wages, - - - -	5,880 09	
		8,250 44

Item 4.

For small engine and stand pipe, at Roxb. Reservoir, to supply Germant'n :		
Bricks, - - - -	25 60	
Flag stone, - - -	162 91	
Lumber, - - - -	100 38	
Mains, - - - -	167 63	
Boiler, - - - -	1,800 00	
Mason work, - - -	583 11	
Wages, - - - -	1,346 57	
		4,186 20

Item 5.

For incidentals :		
Measurer's charge, - -	27 67	
Survey of lot, &c., - - -	87 00	
Sundries, - - - -	20 00	
		134 67
		$695,468 68